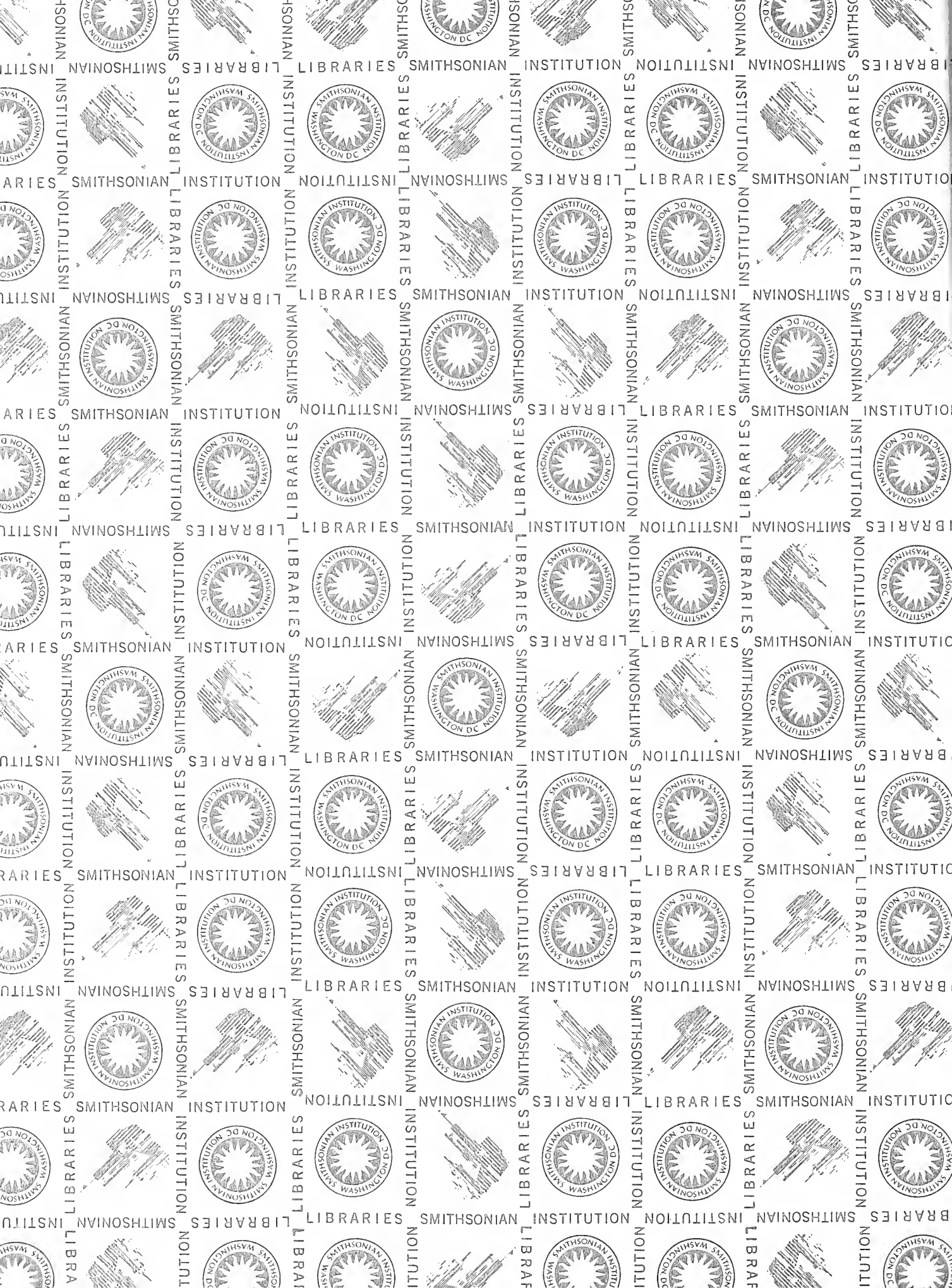
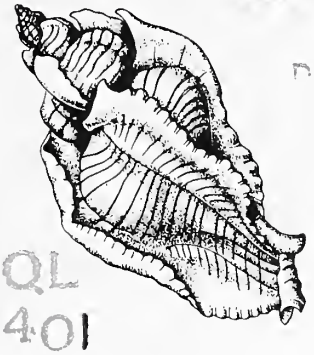

SMITHSONIAN INSTITUTION LIBRARIES

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI January 1979 No. 1

PROGRAM: Forrest and Leroy Poorman will speak on "The San Carlos Rectangle." Their up-to-the-minute talk (they just returned from Mexico) will be accompanied by slides and a shell display under glass.

Date: Jan. 18. Time: 7:30 P.M. Room 104

THE CHRISTMAS PARTY

By BLANCHE BREWER

One more Shell Club Christmas Party is now history. Statistically, it was the seventeenth--enjoyably it was definitely one of the best.

La Sala, in the House of Hospitality, has the warm feeling of a private home and is just the right size for a group like ours. We had time before dinner to greet old friends and new. There were several present who hadn't been seen for a long time. We missed the treasured members who were absent.

During dinner (which was delicious--and the wine) we thanked the outgoing officers and presented the officers for '79, and we toasted the newlyweds, Dr. and Mrs. Hans Bertsch, who were being married that evening. Then, for the third time, we were charmed and entertained by the choral group, The Madison High Honor Ensemble under their director, Mr. Gilbert Sloan. It's entirely joyful to listen to--and watch them. They so obviously enjoy singing together. They move to and through their audience including their listeners in the spirit of their songs.

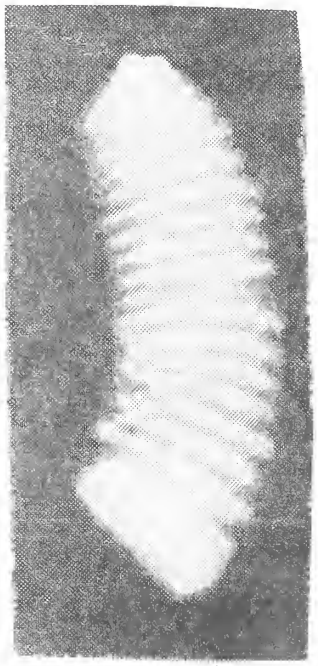
When the singers had left we drew numbers for the shell gifts. There was no waiting to open the packages. Who says Christmas is for children? Then Carole Hertz "sat down to the piano" and she played and played and we sang and sang--two books worth of Christmas carols. We did have such a good time--and to those who couldn't be there, we missed you--and Happy New Year!

MINUTE SHELLS

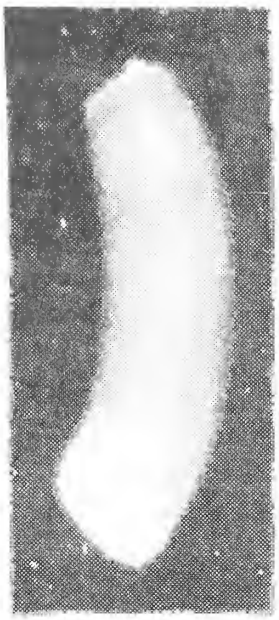
By JULES HERTZ

The Family Caecidae consists of numerous small shells commonly found in grunge taken either intertidally or dredged. The spiral nuclear whorls are shed when the teleoconch begins to form and are replaced in most species by an apical plug. This month, we feature some common species from Southern California and Baja California. The species are representative of three genera, i.e. (1) Caecum Fleming, 1813, (2) Fartulum Carpenter, 1857, and (3) Elephantulum Carpenter, 1857.

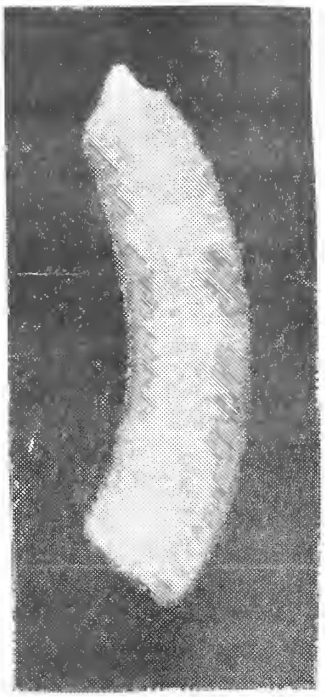
In the Genus Caecum, the identifying feature is a series of well-developed annulations (rings) which encircle the tube. This can be seen in the three species below from Southern California with the C. dalli Bartsch, 1920 showing more developed annulations than the C. californicum Dall, 1885 which in turn is more developed than the C. crebricinctum (Carpenter, 1864). There are several species of Caecum found in the San Felipe, Baja California, Mexico area and pictured below is one tentatively identified as C. quadratum Carpenter, 1857.



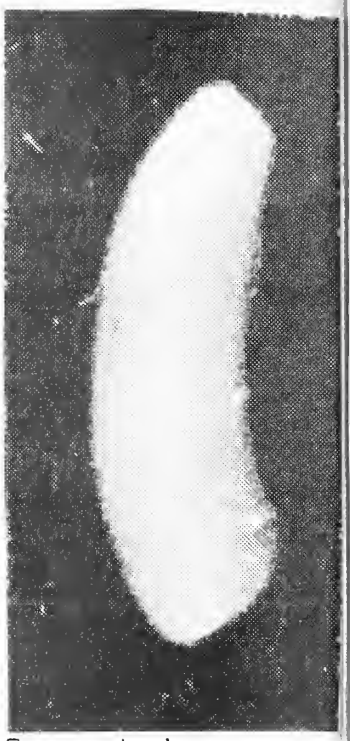
Caecum dalli
Bartsch, 1920
Length: 2 mm.
Feb. 18, 1926
La Jolla, Ca.
in grunge.



C. californicum
Dall, 1885
Length: 2.5 mm.
Leg. J. Hertz
May 21, 1966
under rocks, Bird Rock, San Diego, Ca.



C. crebricinctum
(Carpenter, 1864)
Length: 4 mm.
Leg. D. Mulliner
May 17, 1970
in grunge, 80 ft. off Pt. Loma, San Diego, Ca.



C. quadratum Carp.18
Length: 2.8 mm.
Leg. J. Hertz
Mar. 9, 1970
Radar Beach, 20 mile
south of San Felipe,
B.C., Mexico, on pen
shell in coarse sand

The species in the Genus Fartulum are distinguished by being smooth and having a cap-shaped apical plug. The Fartulum orcutti (Dall, 1885) pictured on the following page was found in grunge taken from the Entrance Channel, San Diego, Ca.

There is considerable confusion in the literature as to the genera of the Caecidae. Keen (1971) states, "Although genera have been named on the

basis of shell characters, they are far from being clear cut, and many species are assigned with difficulty because they seem to be borderline between two genera." This is particularly true when considering the genera Elephantulum Carpenter, 1857 and Elephantanellum Bartsch, 1920. Keen's key on the Caecidae distinguishes these in the following way, i.e. the sculpture of species of Elephantulum consists only of longitudinal ridges while that of Elephantanellum species consist of both longitudinal ridges and rings. This becomes a very difficult identification problem when the shells have faint annulations or when the shells are worn. I agree with Abbott (1974) who deals with this problem by putting Elephantanellum in synonymy to Elephantulum Carpenter, 1857. His description of distinguishing characteristics for Elephantulum are medium to large specimens, longitudinal ridges or axial rings or a combination of both in varying degrees of strength, and usually a strong and pointed mucro. However, Abbott considers Caecum Fleming, 1813: Fartulum Carpenter, 1857; and Elephantulum Carpenter, 1857 as subgenera to the Genus Caecum Fleming, 1813. In this matter, I agree with Keen's treatment which considers them as individual genera.

The shell pictured below is tentatively identified as Elephantulum liratocinctum Carpenter, 1857. The specimen which is pictured is a worn one which complicates identification. Carpenter originally described a number of variants to E. liratocinctum such as subconicum, subobsoletum, and tenuiliratum, which are now given full species status (Keen). It is possible that the shell below is one of the variants.

Photographs of all the specimens were taken by David K. Mulliner, FESTIVUS staff photographer.

Fartulum orcutti (Dall, 1885)
Length: 3.7 mm.
Sept. 7, 1970
Leg. C.M. Hertz
Entrance Channel, San Diego, Ca.
in grunge, 10-20 ft.

Elephantulum liratocinctum Carp., 1857
Length: 3.5 mm.
Concepcion Bay, Baja Calif., Mexico
In grunge, old collection

REFERENCES

Abbott, R. Tucker, 1974. American Seashells, Second Edition, Van Nostrand Reinhold C., 663 pages.

Keen, A. Myra, 1971. Sea shells of tropical West America, Stanford Univ. Press. 1064 pages.

IN MEMORIAM

With deep sadness we report the death of our longtime friend, Waneta Ames. She died following surgery and a long illness, on December 29, 1978 in her home in Eureka, Arkansas.

Waneta was a cherished member of the San Diego Shell Club and a generous one. Many a fun-filled Club auction was held in the lanai of the Ames' home in San Diego. After their return from Cliff's second tour of duty in Japan, Waneta became a dealer in shells and generously donated shells to many organizations' fundraisers throughout the country. Those who knew Waneta hold memories of her humor and her many kindnesses.

Our heartfelt sympathy goes out to her husband, Cliff.

LIBRARY NOTES

DARB HA W. MYERS

We wish to thank Mae Dean Richart for her very generous donation to the Shell Club Library of Wagner and Abbott's Standard Catalog of Shells, Third Edition, 1978, by Robert J. L. Wagner and R. Tucker Abbott. Greeneville, Delaware. $35.00.

This is an updated and revised edition of the material in the 1967 (2nd Ed.) of Van Nostrand's Standard Catalog of Shells. Added-- are many names to the collector's favorite families i.e. Cypraeidae, Muricidae, Volutidae and Conidae. New-- are sections on the families Epitonidae, Columbellidae and Olividae. Values are mostly conservative, arranged alphabetically in a separate section.

Printed on heavy durable paper, the volume is contained in a somewhat unwieldy loose-leaf notebook so that possible future material may be added. While gaining the advantage of expansion, it has lost the pocket-size convenience of the previous editions. Adding to its bulk are 50 blank sheets for listing your own collection, plus 48 pages of world maps. It is doubtful if the 14 pages of agriculture, industry and resource maps will be in constant use by the collectors-owners of the volume.

A quick reference to the nomenclature of the families it covers, it is extremely useful to both dealers and collectors alike.

BATHYBEMBIX BAIRDII (DALL, 1889) AND THE TYPES OF SOME RELATED GENERA

By BARRATT W. MYERS*

Bathybembix bairdii (Dall, 1889)
Diam. 37 mm Ht. 44 mm

The above pictured trochid, Bathybembix bairdii (Dall, 1889), was received from Ron McPeak, Senior Biologist, Kelco, and is in the Myers Collection. It was collected April 29, 1976, 10 miles south of Santa Rosa Island, California, in 807 m of water.

Dall (1889) named the species and described the soft parts, but only briefly described the shell in the Bulletin, Museum of Comparative Zoology 18:377. A lengthy description of the shell appeared in 1890 in Proceedings of the U. S. National Museum 12:346. The type, in the U. S. National Museum, was collected by the Albatross Expedition off San Clemente Island, California, Stn. 2839, in 414 fms on a sand bottom.

A rather rare deep water species, it has been shifted about generically in Margarites Gray, 1847, Turcicula Dall, 1881, Bathybembix Crosse, 1893 and Lischkeia Fischer, 1879.

Dall originally assigned the species to Turcicula Dall, 1881, then a subgenus of Margarita Leach. Dall gave no date for Margarita Leach and in checking the literature I found that Leach used Margarita as a genus in 1814 and again in 1819. Margarita Leach, 1814 turned out to be a bivalve; therefore Margarita Leach, 1819, a trochid, was a homonym. Leach emended Margarita to Margarites, but it was published as a manuscript name by J. E. Gray in 1847. Margarites Gray, 1847 (= Margarita Leach, 1819, non Margarita Leach, 1814).

The type of Margarites Gray, 1847, by monotypy is (Clio) helicinus (Phipps, 1774), (Synonym: Trochus helicinus Fabricius, 1780). It is a small species about 7 mm with a smooth exterior, deep umbilicus, flat base and round aperture. Except for the round aperture, none of these characters apply to Bathybembix bairdii (Dall, 1889), which attains a diameter of over two inches, has nodulous spiral sculpture, is not umbilicate and has a rounded inflated base. Therefore, B. bairdii (Dall, 1889) has no close relationship to the genus Margarites Gray, 1847.

The type of Turcicula Dall, 1881, by monotypy, is Margarita (Turcicula) imperialis Dall, 1881, described from a single immature broken specimen. Dall gave no generic characters for his new subgenus other than his description of T. imperialis, which he described as thin, conical, umbilicus reduced to a mere chink, aperture rectangular, base flattened, with deep suture partly obscured by a double row of scales etc. Bathybembix bairdii differs from Turcicula imperialis in its inflated rounded whorls and inflated base, circular aperture, lack of umbilicus, thin epidermis and plain suture.

These obvious differences caused problems. Other authors have confused the more common bairdii as a representative type of Turcicula because of Dall's statement in 1890 (PUSNM 12:348) following his description of bairdii "--- has enabled me to fully describe the characters of the group and determine its place in the system of classification". Thus we have two dissimilar types for the genus Turcicula.

In the meantime, Bathybembix Crosse, 1893, new name for Bembix Watson, 1879, a homonym of Bembix de Koninck, 1844, by its type B. aeola Watson, 1879, incorporated all the generic characters of bairdii, rounded inflated whorls and base, circular aperture, lack of umbilicus, thin epidermis and plain suture.

In 1908 Dall attempted to re-establish his genus Turcicula, by placing Bathybembix Crosse, 1893 in the synonomy of Turcicula, but as stated above, the type of Turcicula, T. imperialis, shares few generic characters with the type of Bathybembix, B. aeola. Thus we have two genera with dissimilar generic characters being combined into one genus.

Abbott (1974) places Bathybembix as a subgenus of Lischkeia Fischer, 1879. The type of Lischkeia is L. alwinae (Lischke, 1871) (= Trochus moniliferus, Lamarck, 1816, non 1804). L. alwinae has a flat base, angular aperture and slit-like umbilicus. Lischkeia appears somewhat similar to Turcicula, but is very different from Bathybembix. Another perplexing combination.

Summary of the genera and types:

Margarites, Gray, 1847 --	type- M. helicinus (Phipps, 1774)
Lischkeia Fischer, 1879 -	type- L. alwinae (Lischke, 1871)
Turcicula Dall, 1881 -	type- T. imperialis Dall, 1881
Bathybembix Crosse, 1893-	type- B. aeola (Watson, 1879)

I conclude that Bathybembix Crosse, 1893, should be recognized as a distinct and valid genus; that bairdii which has all the generic characters of Bathybembix and which resembles the type species B. aeola (Watson, 1879) should then be assigned to this genus.

Acknowledgement

My very special thanks to Anthony D'Attilio, Curatorial Assistant, San Diego Natural History Museum, for his helpful advice and willing assistance in comparing the genera.

Literature Cited.

Abbott, R. T., 1974. American Seashells. 2nd Edition. p. 39.

Crosse, H., 1892. Etudes Malacologiques Sur des Genres Nouveau ou Peu Connus. Journ. de Conchy. Vol. 40 pp. 288-292

Dall, W. H., 1881. Bull. Mus. Comp. Zool. Harvard Coll. Vol. 9, pp. 42-43.

--------1889. Bull. Mus. Comp. Zool. Harvard Coll. Vol. 18 p. 377

--------1890. Proc. U. S. Nat. Mus. Vol. 12 pp. 346-348.

--------1908. Bull. Mus. Comp. Zool. Harvard Coll. Vol. 43 pp 348-349.

Gray, J. E., 1847. Ann. Mag. Nat. Hist. Ser. 1, Vol. 20 p. 273.

Lischke, Dr. C. E., 1871. Japanese meeres-Conchylien pp. 84-85.

*Associate, San Diego Natural History Museum, Dept. of Marine Invertebrates

---

FROM THE MINUTES
November 16, 1978

By SANDIE SECKINGTON

Prior to the beginning of the meeting and during refreshment break, a silent auction was again held on a selection of corals and shells.

Carol Skoglund, the speaker for the evening, acquainted us with collecting in Panama. In addition to her discussion of good shelling places, she gave us a look at the people of the country and their customs. She showed some wonderful slides of shells nestling on the undersides of rocks. It was a delightful presentation and caused everyone to contemplate packing their bags for Panama.

Anthony D'Attilio, assisted by beautiful slides taken by Barbara Myers, discussed unidentified specimens of Coralliophilidae sent to him from the Philippines.

During the business portion of the meetinn the minutes of the previous meeting were corrected. Karen Hogan was the nominated Recording Secretary and Jacquie Berzins the Corresponding Secretary rather than vice versa as was recorded.

Election of officers for 1979 took place. Bob Schoening stated he must decline the nomination for president since he is being transferred. Hugh Bradner was nominated in his stead. There being no further nominations from the floor, the motion was made and seconded to accept the slate of officers. The motion passed. New officers are Hugh Bradner, President; Sandie Seckington, Vice-President; Walter Robertson, Treasurer; Karen Hogan, Recording Secretary and Jacquie Berzins, Corresponding Secretary.

Following much discussion over reports that the San Diego School District had plans to take over use of rooms in the Casa Del Prado for student activities, the motion was made and passed that the San Diego Shell Club protest the use of the rooms in the Casa Del Prado by the San Diego City Schools.

Following the drawing for the regular door prize and the bonus drawing the meeting was adjourned.

NOTICE

On the next page, detachable for inclusion with past issues, is an index by author for the years 1970-1977 (Vols. I-IX). (The 1978 index was in the Nov. 1978 issue). In the future each November issue will include an index for that volume.

A SELECTED INDEX TO VOLUMES I - IX (1970-1977)

Listings appear alphabetically by author. Volumes I-IX cover the years 1970-1977. A printing error resulted in the year 1977 being listed as Vol. VIII through August and Vol. IX from September through November.

BAILY, JOSHUA L.
Memories of Dr. William Healy Dall. (as presented to WSM/AMU - June 1975) Vol. VI, No. 8: 48-50.

BIBBEY, JOE
Night Diving in the Philippines. Vol. II, No. 4: 6-7.

BISHOP, MARTIN S. & SUSAN J. BISHOP
Attracting Nassarius Mud Snails to Bait. Vol. II, No. 5: 7.

BISHOP, SUSAN
Fluorescence in Molluscan Shells. Vol. II, No. 4: 1-3.

BISHOP, SUSAN & MARTIN BISHOP
Collecting On the Rocky Shore in England. Vol. II, No. 10: 5-6.
Note On The Occurrence of Bittium quadrifilatum (Carpenter, 1864) In Mission Bay. Vol. II, No. 8: 5.

BRADNER, HUGH
The Common Cowries of Fanning Island. Vol. VI, No. 11: 70-71.
A New Epitonid From The Ocean Depths. (Amaea siapnoi) Vol. VIII, No. 9: 60.

BRADNER, MARGE
Fanning Island - December 1975. Vol. VIII, No. 1: 4-5.
From..."Our South Pacific Holiday 1974." Vol. V, No. 11: 153-157.
Night Adventure in Fiji. Vol. VI, No. 2: 7-8.

BRADNER, MARGE & HUGH BRADNER
Tahiti - 1975- The Island of Maupiti. Vol. VII, No. 4: 21-24.

BRATCHER, TWILA
Collecting in Cuba. Vol. V, No. 4: 105-108.
Museum Musings. Vol. VI, No. 10: 65.
Notes on the Terebridae of the Eastern Pacific. Vol. I, No. 2: 1-3.
Ovovivaparous Volutes. Vol. VIII, No. 5: 30-31.
Silver Lining. (Diving in Ecuador) Vol. II, No. 10: 6-7.
Those Crazy Mixed-Up Cowries. Vol. VII, No. 9: 54.
Tonga Expedition. Vol. IV, No. 2; 8-10.

BREWER, BLANCHE
A Trip to Easter Island. (from a talk to the Club by David Thomas) Vol. VII, No. 1: 1-2.
Armchair Collecting. (from a talk to the Club by Anthony D'Attilio) Vol. II, No. 9: 1-3
Holiday in Micronesia. (from a talk to the Club by Twila Bratcher & Billee Wilworth) Vol. I, No. 4: 1-2.
"Minute Shells" (from a talk to the Club by Bertram C. Draper) Vol. II, No. 5: 1-4.

CLOVER, PHILLIP W.
Shell Collecting in Southern Spain. Vol. II, No. 6: 1-2.
Recently Named Cypraea. Vol. VII, No. 6: 32-35.

COOK, Mrs. GEORGE
Stopover in Baja. (from a letter) Vol. VI, No. 3: 14-16.

CURRIN, NORM
Cypraea Jackpot. Vol. II, No. 1:10.
Notes on a Mexican Shell Collecting Trip. Vol. II, No. 3: 1-5.
Searching for Lobiger in the Caulerpa. Vol. II, No. 2: 5.
Shelling In Senegal. Vol. VIII, No. 2: 10-15.
Shelling on the Maine Coast. Vol. IV, No. 2: 11-13.

D'ATTILIO, ANTHONY
New or Poorly-Known Coralliophilidae and Muricidae From The Western Pacific, (Part I). Vol. VIII, No. 10: 70-73.
New or Poorly-Known Coralliophilidae and Muricidae From The Western Pacific, (Part II). Vol. VIII, No. 11: 76-79.
Patterns in Conus textile and Omaria Complexes. Vol. I, No. 9: 1-6.
Recent and Fossil Typhinae of the New World. (as presented to WSM/AMU-June 1975) Vol. VII, No. 5: 27-30.
Remarks on Coralliophilidae (Gastropoda, Muricacea). Vol. III, No. 8:2-5.
The Intritacalx An Undescribed Shell Layer in Mollusks. Vol. II, No.8: 1-4.
The Periostracum of Mollusks. Vol. III, No. 7: 6-7. (reprinted courtesy N.Y. Shell Notes) Vol. III, No. 7: 6-7.
The Typhine Shell: Theme, Development and Elaboration. (as presented to WSM, June 1974) Vol. VI, No. 9: 53-60.

DILWORTH, BILLEE
Diving in the San Juan Islands. Vol. VII, No.11: 60.
Hawaiian Shelling. Vol. VII, No. 3: 14-15.
Samoan Hideaway. Vol. III, No. 10: 2-3.
Scammons Lagoon. Vol. V, No. 7 (June): 117.
Shells By the Touch System. Vol. V, No. 10: 150.
Symbiotic Relationship? (on Megathura crenulata) Vol. VII, No. 8: 5-6.

DRAPER, BERT C.
Check List of Shells Found in Scrapings From Spondylus princeps Taken at a depth of 40 feet, Southeast of Santa Rosalia, Baja California, 1969. Vol. III, No. 4: 5-7.
Checklist of shells Collected at Cholla Bay, Sonora, Mexico. Vol. VI, No. 11: 67.

GEMMELL, JOYCE
Excerpts From Joyce Gemmell's Letter From San Felipe, Baja Calif., Mexico. Vol. V, No. 2: 93.
Field Observations on Gastropod Breeding and Egg Laying. Vol. IV, No. 5: 32-34.
Microscopic Observations. Vol. VI, No. 7: 41-42.
Notes on Egg Capsules and Larval Development of Typhis clarki Keen & Campbell, 1964. Vol. V, No. 3: 100-103.
Observations of Typhis At San Felipe. Vol. I, No. 11: 3-4.
Observations on Nassarius moestus (Hinds, 1844) From San Felipe, Baja Calif., Mexico. Vol. IV, No. 8: 56-57.
Shrimp Boat Shelling. Vol. VI, No. 6: 34-35.

GOOD, BARBARA
Aquarium Observations - Polypus Bimaculatus - "Puss". Bol. I, No. 7: 7-8.
Aquarium Observations. (Cypraea spadicea) Vol. III, No. 4: 4.

HAMANN, GREG
A First Dredging Trip. (Conus xanthicus) Vol. VIII, No. 8: 57.

HANSELMAN, GEORGE A.
A Tiger in Your Tank. (Placiphorella velata) Vol. VII, No. 1: 3-6.
Some Hints on the Identification of Chitons (Part I). Vol. IV, No. 4: 24-29.
Part II, Vol. IV, No. 5:35-39.
Part III, Vol. IV, No. 6: 41-45.
Addendum -Corrigendum - Apologia. Vol. IV, No. 7: 47.

HANSELMAN, VIRGINIA
Technical Abbreviations. Vol. I, No. 11: 7-9.

HARGENS, A.R. & S.V. SHABICA
Freezing Resistance in the Antarctic Limpet Patinigera polaris. (Reprinted fom Scripps Inst. of Oceanography) Vol. IV, No. 6: 39.

HERTZ, CAROLE M.
A Call From Dr. Stohler. Vol. VI, No. 1: 2.
A Conversation With Charlene Neeb. Vol. III, No. 4: 2-3.
A Treat For the Snorkeler. Vol. VI, No. 1: 3.
A Weekend At San Isidro, Baja California. Vol. II, No. 11: 7.
A Weekend in Santo Tomas. Vol. I, No. 10: 5-6.
An Unusual Find. (Balanus on Lytechinis) Vol. IV, No. 1: 3.
An Unusual Find and an Unusual Occurrence. (Ficus ventricosus & Strongylocentritus purpuratus shedding gametes) Vol. V, No. 11: 152.
And On To French Polynesia. Vol. VII, No. 7: 42-43.
Anthothoe carcinophila Verrill Vol. VI, No. 7; 42.
Aquarium Observations. (Cypraea spadicea) Vol. I, No. 6: 3.
Aquarium Observations. (Bypraea spadicea) Vol. I, No. 10:4.
Aquarium Observations. (Solen rosaceus, Bursa californica)Vol. II, No.2:7.
Aquarium Observations. (hermit crab & Donax gouldi) Vol. II, No.3: 7.
Aquarium Observations. (Cypraea spadicea egg laying) Vol. II, No. 6: 2-3.
Assiminea californica, Vol. VI, No. 5: 27.
Bornia chiclaya, Olsson, 1961 in San Felipe. Vol. VII, No. 2: 11.
Collecting in Cayucos. Vol. I, No. 2: 13-15.
Collecting in San Felipe. (Tegula rubroflammulata) Vol. II, No. 4: 8.
Correction to "Traveling and Collecting in Fiji". (Vol. VII, No. 2:8) Vol. VII, No. 3: 15.
Finding Chlamydoconcha orcutti Dall, 1884. Vol. VI, No. 8: 50.
Finding Haminoea virescens Intertidally. Vol. VI, No. 3: 17.
On Finding Erato vitellina. Vol. VI, No. 10: 64.
Traveling and Collecting in Fiji. Vol. VII, No. 2: 8-10.

HERTZ, CAROLE M. & JULES HERTZ
Cayucos Revisited...For the Second Time. Vol. III, No. 1: 4.
Eggs of Hormospira maculosa. Vol. VI, No. 6: 36.
Playing in Kauai. Vol. IV, No. 3: 19-20.

HERTZ, CAROLE M. & DAVE MULLINER
An Unusual Find in San Felipe. (Ophichphis triserialis)Vol. V, No. 7: 118.

HERTZ, JULES
An Unusual Find. (Cantharus elegans) Vol. VI, No. 6: 35.
Collecting In Antarctica. Vol. VIII, No.7 : 42-54.
Collecting in the San Felipe Area. Vol. III, No. 6: 7.
Finding Mitromorpha carpenteri in San Diego. Vol. VI, No. 2:9.
Minute Shells. (Seila assimilata, Cerithiopsis neglecta, Nassarina melanosticta) Vol. VII, No. 3: 16.
Minute Shells. (Nassarius scabriusculus, N. gallegos) Vol. VII, No. 4: 20.
Minute Shells. (Odostomia) Vol. VII, No. 5: 26.
Minute Shells. (Cystiscus politulus, Granula minor) Vol. VII, No. 6: 36.
Minute Shells. (Erato scabriuscula, Bittium, Triphora excolpa, Lithophaga calyculata) Vol. VII, No. 7: 44.

Minute Shells. (Triphora postalba, I. alternata, I. adamsi, I. unicolor) Vol. VII, No. 8: 50.
Minute Shells. (Rissoina signae, R. axeliana, R. porteri, Alvinia lara, A. nemo) Vol. VII, No. 9: 53.
Minute Shells. (Mitrella guttata, M. elegans, Nassarius angulicostis) Vol. VII, No. 10: 61.
Minute Shells. (Pseudocypraea adamsoni, Volvulella cylindrica) Vol. VII, No. 11: 61.
Minute Shells. (Alaba interruptelineata, Odostomia clathratula) Vol. VIII, No. 1: 6.
Minute Shells. (Fossarus purus, Pedipes angulatus) Vol. VIII, No. 2: 9.
Minute Shells. (Delonovolva sp., Tricolia diantha, Bulla morgana) Vol. VIII, No. 3: 20.
Minute Shells. (Volvarina taeniolata, Aspella pyramidalis) Vol. VIII, No. 4: 23.
Minute Shells. (Nodolittorina galapagiensis, Agathoma camarina) Vol. VIII, No. 5: 29.
Minute Shells. (Philbertia doris, Tripterotyphis lowei) Vol. VIII, No. 6:40
Minute Shells. (Epitonium replicatum, Heliacus mazatlanicus) Vol. VIII, No. 8: 58.
Minute Shells. (Emarginula velascoensis, Rimula mexicana) Vol. VIII, No. 9: 61.
Minute Shells. (Lucina undatoides, Chione mariae) Vol. VIII, No. 10: 69.
Minute Shells. (Teinostoma politum, Architectonica placentalis) Vol. VIII, No. 11: 80.
Mollusks of Quivira Basin. Vol. V. No. 26: 94-95.
Observations. (Conus regularis) Vol. II, No. 2:7.
Oddities. (Acanthina punctulata) Vol. III, No. 1:5.
What The Waves Washed In. Vol. VIII, No. 3: 17.

HERTZ, SUZANNE
Aquarium Observations. (Cantharus macrospira with eggs) Vol. III, No. 6:4.

HERZ, ROBERT
The Effect of Varying Oil Concentrations On the Marine Diatom Skeletonema costatum (Abstract) Vol. VI, No. 8:51.

HEWITT, SUSAN EX BISHOP
On The Shore in Connecticut. Vol. VIII, No. 1:3.

JAY, MICHAEL
Testing For Red Tide in San Diego Bay. (Abstract) Vol. VII, No. 6: 37-38

KING, FRANK
Adventure on the San Blas Islands. Vol. VII, No. 3: 17-18.

KITTSMILLER, DON
Climbing For Sea Shells (Ecphora quadricostata) Vol. VIII, No. 5: 32-33.

KWIK, GREGORY
Sea Urchin Pherome. (Abstract) Vol. VII, No. 6: 35.

LACHANCE, THERESA M.
A Possible Energy Relationship Between A Bioluminescent Reaction and Photosynthesis in Chlorella. Vol. V, No. 7: 115-116.

MARTIN, CLIFFORD A.
A Remembered Trip. Vol. I, No. 10: 3-4.

MARTIN, CLIFTON L.

A Collector of Rare Shells, With Notes on Its Remarkable Family. (Xenophora) Vol. II, No. 4: 4-5.
A Possible Range Extension For Cypraea beckii Gaskoin, 1836. Vol. VI, No. 8: 55.
Another Name to Change. (Hinnites giganteus) Vol. III, No. 10: 5.
Another Standard Has Fallen. (rarity of shells) Vol. I, No. 8: 5-6.
Ex-Pisces Mollusca Part I. Vol. IV, No. 10: 70-73.
Ex-Pisces Mollusca Part II. Vol. IV, No. 11: 76-83.
Notes on Olivella baetica Carpenter. Vol. I, No. 10: 5.
On The Importance of Keeping Accurate Data. Vol. IV, No. 3: 16-17.
Some Thoughts on Collecting Rare Shells. Vol. I, No.3:4-5.
Some Unusual Exchanges. Vol. I, No. 8: 5-6.
The Deep Water Mollusks of Southern Africa. Vol. V, No. 10: 146-149.
The Golden Age of Shelling. Vol. I, No. 5: 2-3.
The Lure of Collecting Fossil Shells. Vol. V, No. 5: 110-115.
Thomas Nuttall, 1786-1859, His Contributions To The Natural Sciences. Vol. V, No. 9: 140-144.

MICHEL, NOLA

A Fantastic Dive. (for nudibranchs) Vol. VII, No. 8: 46-49.
A Find. (Oxynoe panamensis) Vol. II, No. 6: 5.
A Good Day's Dive. Vol. I, No. 8: 7-8.
Aquarium Observation. (Caecum) Vol. II, No. 8: 5.
Aquarium Observation. (Simnia aequalis) Vol. III, No. 5: 3-4 one plate
Aquarium Observation. (Hexaplex erythrostoma, Astraea gibberosa, Cypraea spadicea) Vol. III, No. 7: 3.
Aquarium Observation. (Crepidula onyx) Vol. III, No. 7: 4.
Notes on the Superfamily Pleurotomariacea. Vol. I, No. 6: 4-5.
Recovery--And Dividends. (mollusks on long-sunk airplane) Vol. II, No. 1:4.
The Calliostoma Dives. Vol. III, No. 8: 6-7.

MULLINER, DAVID K.

Aquarium Observations. (Cassis centiquadrata) Vol. I, No. 6:3.
Breeding Habits and Life Cycles of Three Species of Nudibranchs From the Eastern Pacific. Vol. III, No. 9: 1-5.
Collecting Equipment. Vol. III, No. 6:5. one plate
Collecting in the Sand. (while diving) Vol. VI, No. 4: 24-25.
Identify Your Opisthobranchs. Vol. III, No. 2: 1-2.
Log From the Ameripagos Expedition. Part I, Vol. III, No. 7:2.
Part II, Vol. III, No. 9:6-7.
Part III, Vol. III, No. 10: 4-5.
Part IV, Vol. III, No. 11: 6.
Conclusion, Vol. IV, No.1: 5-6.

MYERS, BARBARA W.

Aquarium Observations.(octopus) Vol. I, No. 6:3.
Aquarium Observations. (Bursa californica) Vol. II, No. 7: 6.
Aquarium Observations. (Kelletia kelletii and hermit crab) Vol. VII, No. 5:26.
Aquarium Observations. (Cypraea spadicea, Bursa californica)Vol. VII, No. 9: 54.
Crocodile Tears. (diving in Concepcion Bay) Vol. VII, No. 11: 62-66.
Discovery. (Loliga opalescens) Vol. I, No. 9:6-7.
Exotic Brown Forest. (fauna of the kelp beds) Vol. VI, No. 11:68-70.
Found on Eel Grass (Zostera). (Notoacmaea scutum) Vol. VII, No. 10:58.
Interesting Patterns of Radsiella petaloides (Gould, 1846). Vol. VII, No. 4:24.
Living on the High Tide. Vol. IV, No. 7: 48-49.
Macrarene cookeana (Dall, 1918). Vol. VII, No. 7: 41.
Puerto Rican Holiday. Vol. VIII, No. 9: 62-66.

MYERS, JOHN M.
A New System of Classification and Identification For the Class Amphineura. (Abstract) Vol. II, No. 5:6.

NAYLOR, WILLIAM E.
Foot and Toe Collecting. Vol. IV, No. 1:4.
Framed By the Pink Murex. Vol. III, No. 3:2.

OKUTANI, TAKASHI
Shell Personalities of Japan. Vol. II, No. 1:1-3.
"Sayonara" (and the Key to the species of Janthina) Vol. II, No. 3:5-6.

PERRIN, BILL
Two Days On Clipperton---Or Getting High On Boobies. Vol. VIII, No. 4:24-26

PHILLIPS, JOHN
Dangers in Diving for Shells, Part I, "A Day at Ghost Reef." Vol. VI, No. 1:4-5.
Helpful Hints on Collecting and Cleaning Pteropurpura macropterus and Pteropurpura vokesae. Vol. II, No. 11: 1-4.
"Pan Fried" (Pecten diegensis) Vol. II, No. 9:4-5.
Shell Diving for Sharks off Santa Barbara. Vol. III, No. 2: 6-7.

PISOR, DON
Experiences On A Trip to Haiti and Venezuela, Part I--Haiti. Vol. VII, No. 10: 59-60.
Part II, Venezuela. Vol. VII, No. 3: 18-19.

POORMAN, ROY
A Diary of Retirees. Vol. VIII, No. 6: 36-39.

RADWIN, GEORGE E.
A Review of the Genus Muricopsis (Muricidae; Muricacea). (excerpt from a talk given to the Club) Vol. V, No. 9: 138-140.
Acanthina lugubris Reappears in San Diego. Vol. V, No. 5: 114.
Columbellid Genera of the Eastern Pacific. Vol. V, No. 1: 88-90.
Feeding Habits in Prosobranch Gastropods. Vol. II, No. 10: 2-5.
Food For Thought. (reprinted from S.D.S.N.H.) Vol. I, No. 7: 2-5.
Notes on Generic Names and Placement in the Muricacea and Buccinacea. Vol. II, No. 2: 1-3.
Notes on the Evolution of the Muricidae. Vol. I, No. 1: 3-5.
The Columbellidae (notes from talk given to the Club) Vol. 1, No. 2: 11-13.
The Radula. Vol. II, No. 1: 4-7.
What is a Species? Vol. IV, No. 7: 50-53.

REESE, K.M.
How Sea Animals Fight Falling Salinity. (reprinted courtesy Chem. Engin. News) Vol. IV, No. 11: 75.
Mangrove in trouble in southwest Florida. (reprinted courtesy Chem. Engin. News) Vol. V, No. 2: 104.

RICHART, MAE DEAN
Isolation and Divergence. Vol. III, No. 2: 3-5.

ROBILLIARD, GORDON A.
Comments on a "Draft Report on Recent Abalone Research in California with Recommendations for management. Vol. VI, No. 4: 19-24.
Marine Biology in Antarctica. Vol. III, No. 11: 1-5.
The Nudibranch Dendronotus frondosus--One Species or Four? Vol. VI, No. 8: 44-47.

SCHOENING, BOB
Cowries of Guam, Part I.. Vol. V, No. 7: 122-126
Part II. Vol. V, No. 8: 129-136.

SCHULER, MARTIN
A Dawn Trip to the Tidepools. Vol. VI, No. 6:33.
Artificial Respiration For A Mollusk. (octopus) Vol. VII, No. 9: 55.

SOUDER, JOHN
Cypraea, General Information, Vol. I, No. 7: 6-7.

SPHON, GALE G.
On The Care, Feeding and Preservation of Nudibranchs. (reprinted courtesy N.Y. Shell Notes) Vol. IV, No. 8: 58.

STEINBERG, JOAN E.
Key to the More Common Opisthobranchia. (reprinted with permission of U. of C. Press) Vol. III, No. 3: 5-9.

TALMADGE, ROBERT R.
Notes on Fusitriton. Vol. VI, No. 10: 63-64.

TAYLOR, D.A.J.
Collecting Substrata is Fun(?). (reprinted courtesy RHFSAA newsletter Vol. IV, No. 9: 65-66.

TAYLOR ROLAND & KAY TAYLOR
Shelling Near La Paz. Vol. I, No. 9: 6.
Shelling On The Mediterranean. Vol. VIII, No. 11: 81-83.

THOMPSON, HELEN
A Florida Shelling Trip in 1967. Vol. I, No. 2: 5-6.
Another Day Getting Sentis Pectens. Vol. I, No. 4: 6-7.
Hunting Cypraea on the Florida Keys. Vol. I No. 7: 7.
One Trip Down the Gulf of California. Vol. II, No. 1: 7-9.

WEST, ART
A Seasnake Tale. Vol. I, No. 5: 3-4.

WOODS, WILLIAM L.
A Brief Historical Review of the Genus Sinum Roding, 1798, and a Description of the Location of the Operculum. Vol. II, No. 5: 4-6.

YOUNG, BERNARD
Partial List of Errata in B.F. Kensley's Book, "Sea-Shells of Southern Africa. (reprinted with permission of author) Vol. VI, No. 5: 28-30.

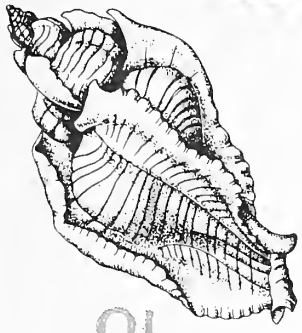
SAN DIEGO SHELL CLUB
% C. HERTZ
3803 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO, CA
JAN 16
P M
1979

THIRD CLASS MAIL

Library - Acquisitions
Smithsonian Institution
Washington, D.C. 20560

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO, BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00; Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave. San Diego, Ca. 92111

Vol. XI February 1979 No. 2

PROGRAM: Snorkeling in Tonga and Samoa, an illustrated talk by Philip Faulconer.

Slides from the September party and the Christmas party.

Silent auction of corals and shells.

Date: Feb. 15 Time: 7:30 P.M. Room 104

FROM THE MINUTES: -January 18, 1979

By KAREN HOGAN

Pres. Hugh Bradner rang in the Club's first meeting of the new year with a friendly lowering of the gavel. New members and guests were introduced..

Roy and Forrest Poorman presented a very enticing talk and slide show on one of their favorite dredging spots in Mexico, San Carlos Bay, 13 miles out of Guaymas. Over a period of 17 years, they have made innumerable hauls bringing forth hundreds of species. Many beautiful slides of specimens they have found were shown. Pictures of the growth of the area of San Carlos over the years left us with mixed feeling over development vs. preservation of remote areas. (An article on the "San Carlos Rectangle" will appear in a future FESTIVUS. Ed.)

After coffee break, a brief business meeting was held. The Club will be accepting donations for the April auction beginning with the February meeting. It's not too soon to sort through your treasures in preparation for the Club's exciting and beggest affair of the year.

As the hour was late, other business was deferred and the meeting adjourned.

THE SHARP-TONGUED MOLLUSKS

By

HUGH BRADNER

Scripps Institution of Oceanography
La Jolla, California

This article is an amateur's introduction to the feeding physiology of mollusks. (I am the amateur. If you know even a little about the subject, stop right here). Feeding habits of mollusks include engulfing whole prey (cones), sucking body fluids (parasites), and binding tiny particles into a mass with mucous (clams and other filter-feeders). Only the cephalopods are like mammals that put food into the mouth and then tear it into small pieces before swallowing. Most mollusks break off small chunks which they transfer to the mouth and swallow whole. They have a radula, a strong toothed tongue which serves the dual function of tearing off bits of food and transporting it to the mouth. The teeth are in about 100 rows so that a radula often looks somewhat like a carpenter's rasp. (Fig. 1). Teeth in a row have specialized functions; the central teeth usually cut and tear, and the outer teeth carry the food to the mouth. In general the "higher" organisms have fewer teeth in a row. Omnivorous Cypraeidae have seven teeth per row; one "central", and symmetrically placed pairs of "lateral", "inner marginal", and "marginal". Haliotidae have one central tooth flanked by two pairs of laterals, three pairs of hook-like marginals, and an array of feathery outer teeth which appear to be efficient for transporting their plant food. (Fig. 2).

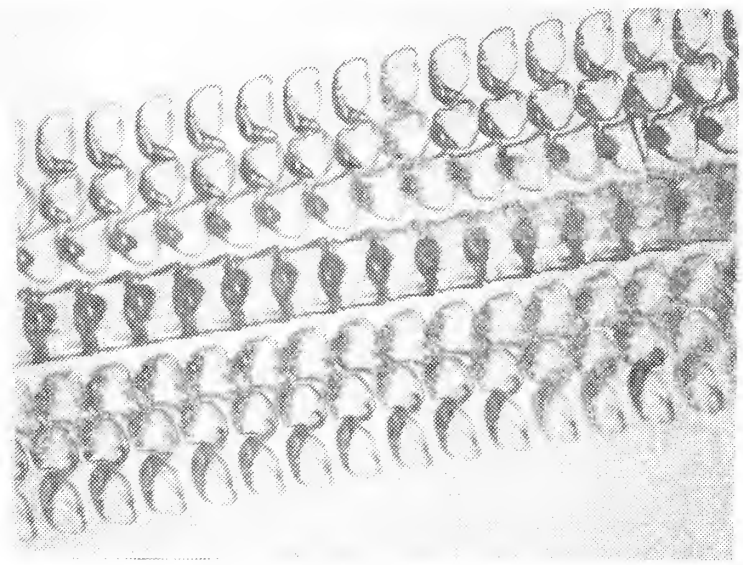


Fig. 1.
Photomicrograph of Cypraea tessellata radula, 56X

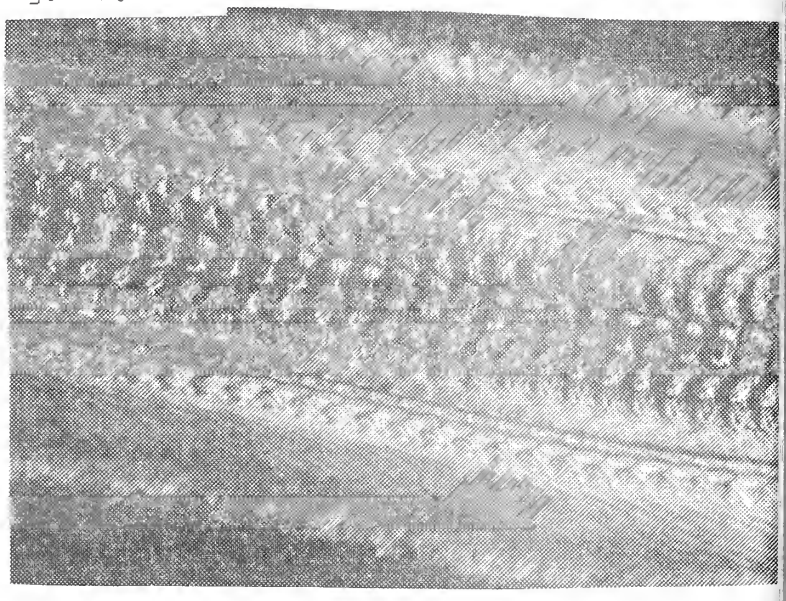


Fig. 2.
Photomicrograph of Haliotis fulgens radula, 10X

Muricidae have three teeth per row. Terebridae have one. Opisthobranchs range from one tooth per row (Sacoglossans) to more than 800, and a total of about 75,000 teeth.

The radula ribbon is supported on a tongue-like "odontophore" with cusps pointing backward. At rest it is curled up inside the "buccal mass" (the mouth) in the end of a long cylindrical muscular proboscis which is an extension of the mollusk's head. To feed, the mollusk extends its

tongue, spreading the flexible radula ribbon over the tip. (Fig. 3). Then with a scrubbing motion of about one sweep per second, it scrapes up food and carries it into the buccal mass. In some species the teeth are interlocked in their erect position near the tongue tip, so that they can exert great pressure to tear the food. Teeth wear out in about a day, and are continually replaced. Most creatures simply discard the worn teeth, but sacoglossans cleverly put them in a sac near the radula base for recycling. They may get significant survival value from this conservation because many mollusk teeth have outer layers of rare materials: silica for hardness, and iron (magnetite) for toughness. The articulation and interlocking of teeth is a complex structural mechanism, different among different families--perhaps among different species.

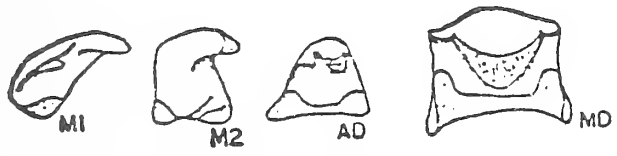
Fig. 3. Schematic of extended radula (Adapted from Solem, "The Shell Makers") The base of each tooth rests against the following one in a manner that gives great strength to its tearing action.

What do they look like in detail these teeth, these radulae? How useful can they be for species identification, or for variation within a species? Gross differences between families are easy to see, even though in many instances the teeth are too small to resolve clearly with an optical microscope.

Under an optical microscope, three-dimensional shapes are better determined visually than photographically, so scientists have usually sketched and described tooth characteristics. Alison Kay, for example, proposed a four-type designation for Cypraeidae: (Ref. Proc. Malacological Soc. London, 1960, 33: 278-287).

R_1 C. caputserpentis, C. mauritiana, C. helvola, and about 30 others.
R_2 C. isabella, C. tessellata, C. talpa and C. cinerea.
R_3 C. teres, C. goodalli, C. cribraria, C. quadrimaculata and C. kieneri.
R_4 C. tigris, C. lynx, C. sulcidentata, C. vitellus, C. carneola and C. arenosa.

Fig. 4.



Cypraea tessellata

from KAY: GENERIC REVISION OF CYPRAEINAE
Proc. Mal. Soc. London, 1960, 33: 278-287

Her sketches for C. tessellata are reproduced in Fig. 4. Her description is "In pattern R_2 the median tooth is pronouncedly broader than it is long, and characterized by distinctly staining internal bracts which extend vertically in the tooth.....Basal denticles are lacking. The admedians are smaller than the median and more or less triangular in shape. The marginals

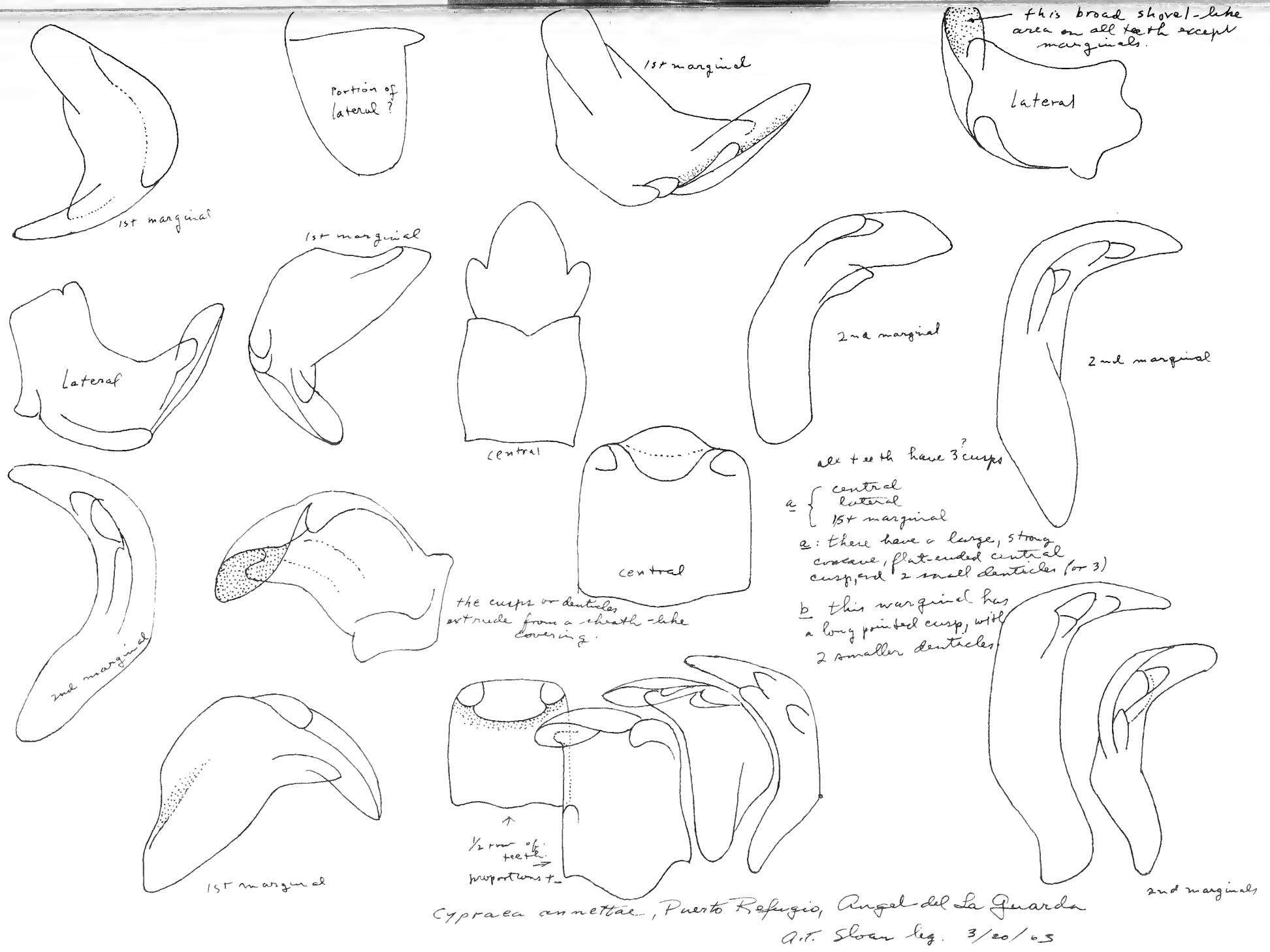


Fig. 5. Sketches of Cypraea annettae radula by Anthony D'Attilio

are short and stout, the median cusp forming a blade-like projection. All the teeth in the radular row are distinctly separate from one another."

Such descriptions coupled with good sketches can serve to determine the group designation of most Cypraeidae; but species identification is very difficult or impossible by this method.

The combination of sketch and description can sometimes be as informative as a photograph.....for example, the meticulous drawings of Anthony D'Attilio (Fig. 5). Drawings can even render truer perspective than microphotographs, but they can also be subjective or inaccurate. Recently there has been increasing use of scanning electron microscopes to get sharp detail and great depth of field in examining small objects. The advantage in radula studies is evident from comparison of Fig. 1 vs Fig. 6 or Fig. 7.

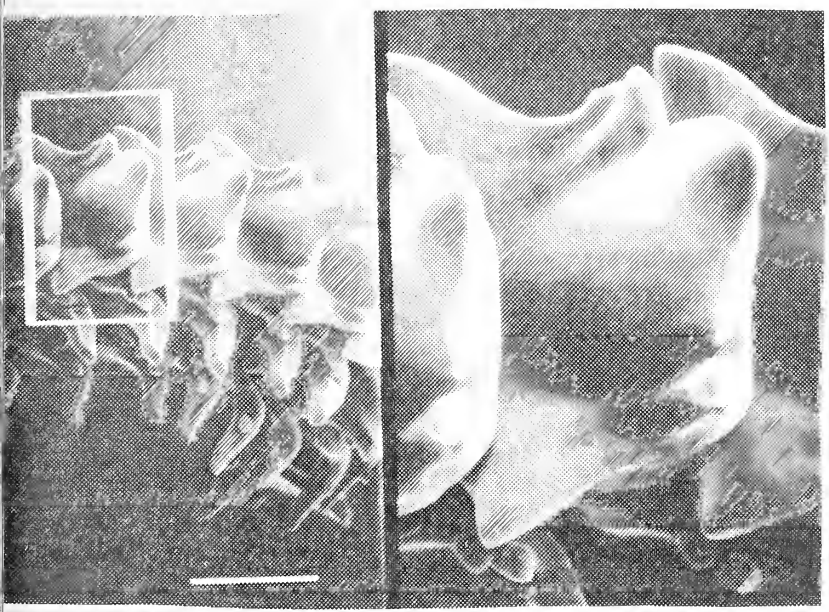


Fig. 6 S.E.M. photo of Cypraea tessellata radula. (Kay type 2) 150/450X

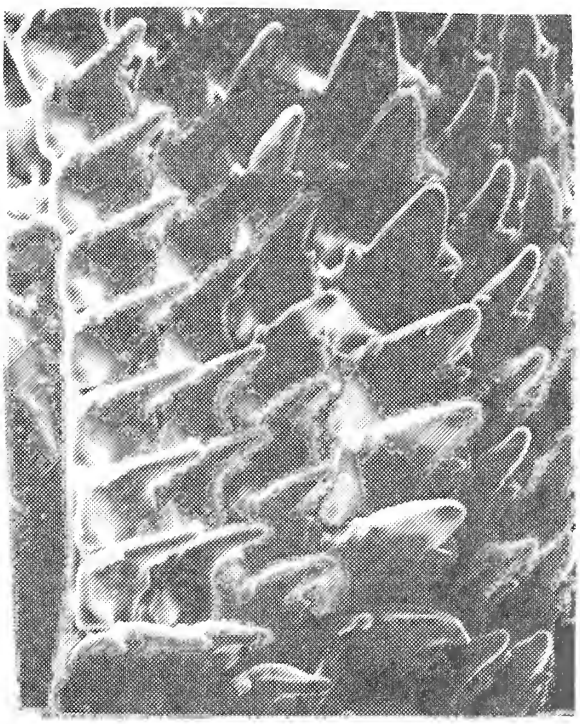


Fig. 7 S.E.M. photo of C. tessellata radula from different angle than Fig. 6. 100X

However, S.E.M. photos can also be misleading if taken from an unusual angle; this is illustrated in the two views of C. tessellata (Fig. 6 and Fig. 7) which appear very different. The confusion can be avoided by taking stereoscopic photographs from nearly constant "standard" orientation.

Though several scientists have questioned the value of optical radula studies in species identification, differentiation between Alison Kay's types is easy with S.E.M. photos. Compare C. tessellata (type 2) Figs. 6 and 7 with C. vitellus (type 4) Fig. 8 and C. poraria (type 1) Fig. 9.

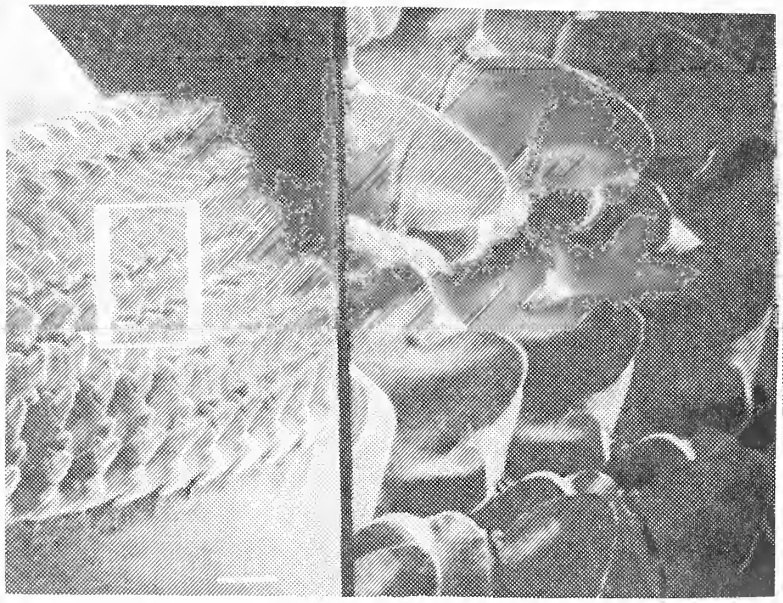


Fig. 8, S.E.M. photo of Cypraea vitellus radula. (Kay type 4) 75/225X

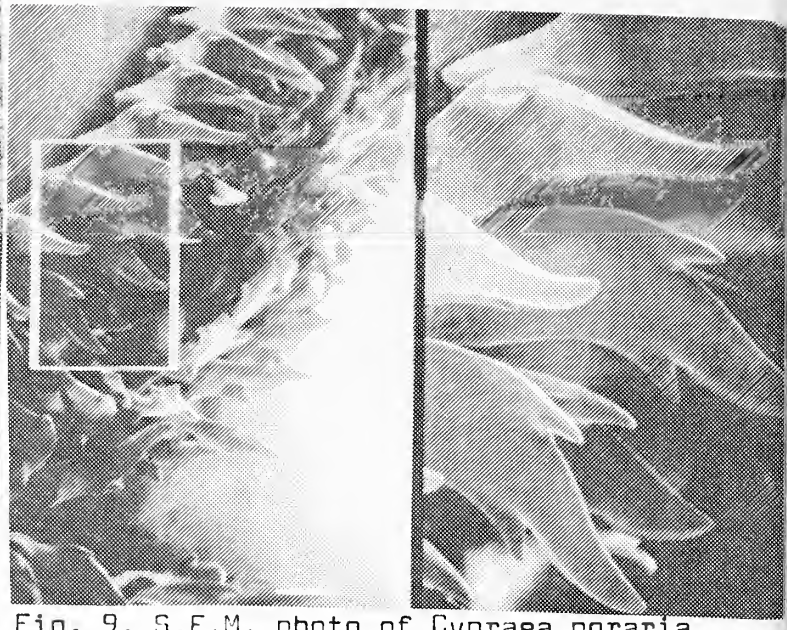


Fig. 9. S.E.M. photo of Cypraea poraria radula (Kay type 1)

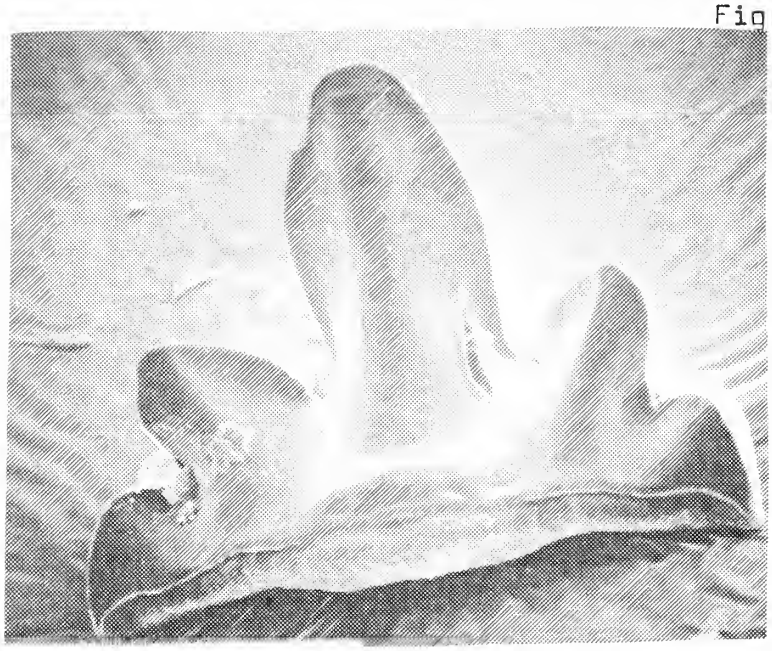


Fig. 10. S.E.M. photo of Cypraea lynx median tooth (Kay type 4)

Fig. 11. S.E.M. photo of C. fimbriata median tooth (Kay type 1)

A striking difference between median tooth shape is shown in Cypraea lynx (type 4) Fig. 10 and C. fimbriata (type 1) Fig. 11. Even within a single type there may be readily distinguishable features. For example, C. fimbriata (Fig. 11) has two protuberances at the base and five points at the tip; while C. depressa Fig. 12 has two protuberances at the base and three points at the tip; and C. granulata Fig. 13 has only one protuberance, and a tip that is distinguishably different from either C. fimbriata or C.

Fig. 12. S.E.M. photo of C. depressa median tooth (Kay type 1)

Fig. 13. S.E.M. photo of C. granulata median tooth (Kay type 1)

depressa. To see whether two closely allied species can be differentiated by S.E.M., I have made photos of Cypraea isabella and C. isabellamexicana which can have indistinguishable shells. Examination of Fig. 14 vs Fig. 15 shows that they are indeed different. The difference is verified in stereo photographs of individual teeth. The results are so encouraging that I have begun a catalog of S.E.M. stereo photos of radula teeth at the familiar optical viewing angle. Such a catalog will be useful for clarify-

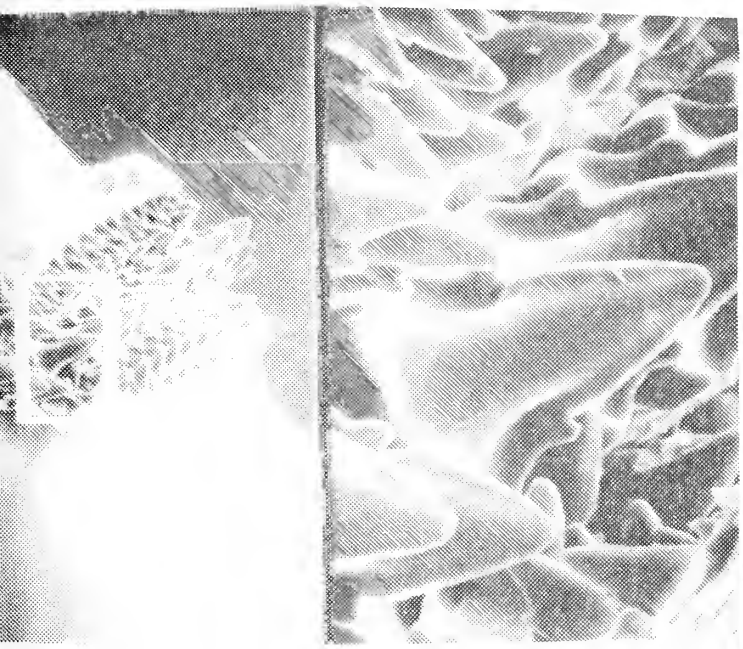


Fig. 14. S.E.M. photo of C. isabella radula 80/400X

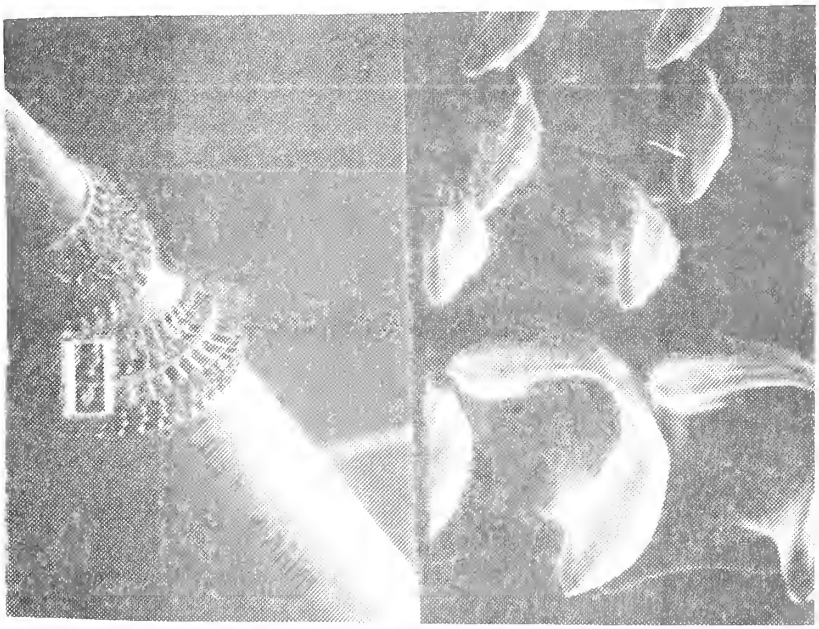


Fig. 15. S.E.M. photo of C. isabellamexicana radula 20/200X

ing optical observations. Fig. 16 (a) and (b) show a typical stereo pair, which you can view in 3-dimensions by looking cross-eyed. Additional useful investigations will be comparison of several radula from Cypraea of the same species collected worldwide, and a comparison of male vs female.

Meanwhile if you collect any live specimens of uncommon cowries, please preserve them in alcohol. I'll be pleased to clean them carefully for you!

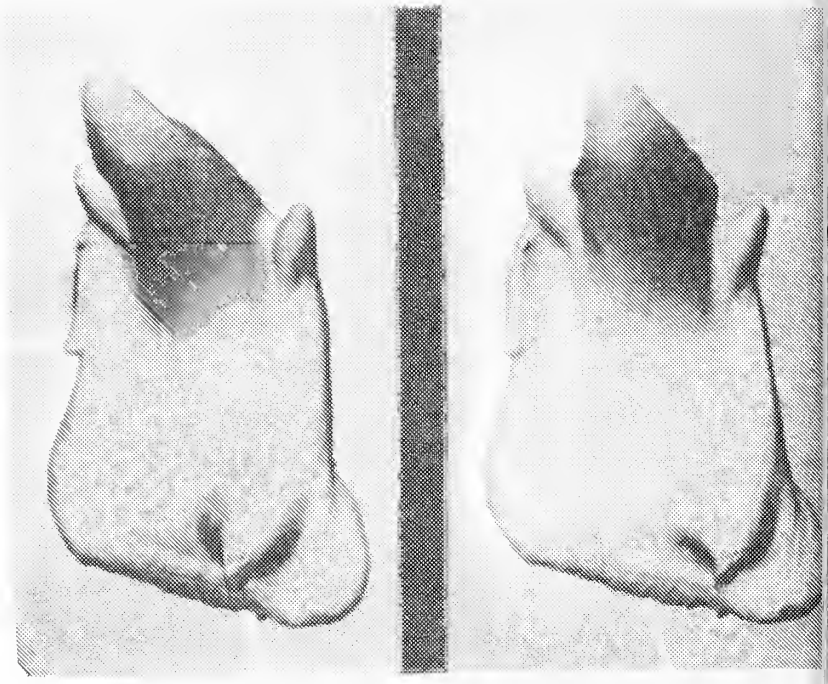


Fig. 16. S.E.M. stereo photo of C. isabella lateral tooth. 500X

CHANGE OF ADDRESS

BERTSCH, Dr. & Mrs. Hans, 11613 La Colina Rd., San Diego, Ca. 92131 (566-4485)

FERGUSON, Raymond A., 4171 Spearfish La., San Diego, Ca., 92124.

MCPEAK,Ron, 7989 La Brusca Way, Carlsbad, Ca. 92008. (942-3489)

MINOR, Mr. & Mrs. Michael, Fleacts Det., Box 556, F.P.O. Seattle, Wa. 98761.

STOWELL, Kit & Linda, 5102 Towle Ct., San Diego, Ca. 92105

NEW MEMBERS

BURCH, Mrs. John D., 1300 Mayfield Rd., Apt. 61-L, Seal Beach, Ca. 90740.

DELAWARE MUSEUM of Natural History, Box. 3937 Greenville, Delaware 19807.

JANOWSKY, Dorothy, c/o Mal de mer Enterprises, 946 Ralph Ave., Brooklyn, N.Y. 11236

SMITHSONIAN INSTITUTION, Library Acquisitions, Washington, D.C. 20560.

TISDALE, Dr. William, 4329 Avalon Dr., San Diego, Ca. 92103.

NOTICE

An adult class entitled "Underwater San Diego" will be given by Dr. Hans Bertsch under the auspices of the Natural History Museum. The class will meet on Wednesdays (February 28-March 21) from 6:30 - 8:30 P.M. It will be limited to 30 students. The emphasis of the class will be on identification and ecology of marine invertebrates. There will be four evening lectures (with slides) and two field trips. For further information call the Natural History Museum (232-3821).

Favartia garrettii (Pease, 1868): Notes and Corrections to the Literature

By

JULES HERTZ & ANTHONY D'ATTILIO

Department of Marine Invertebrates
Natural History Museum
San Diego, California 92112

A newly dead specimen of *Favartia garrettii* (Pease, 1868) was collected by J. Hertz, August 18, 1978, intertidally under a rock on the north end of Laie Bay, Oahu, Hawaiian Islands. The specimen, pictured below, is reddish brown throughout. Radwin and D'Attilio (1976) described the species as having a white shell with two diffuse red-brown bands, one on the shoulder and one on the base of the body. A review of the specimens in the San Diego Natural History Museum used by Radwin and D'Attilio showed that they were beach worn, and the waxy white shells may not represent a true shell color for this species. Therefore a search of the early literature was initiated.

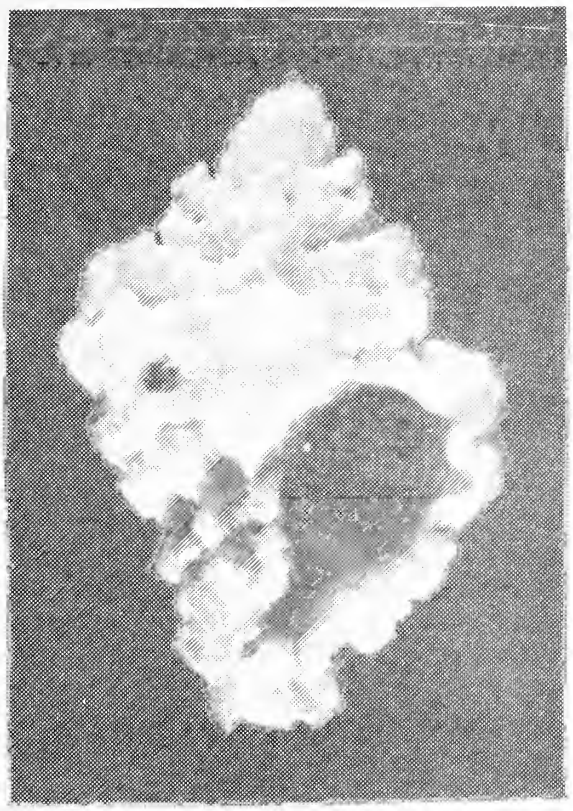


Fig. 1a Apertural view

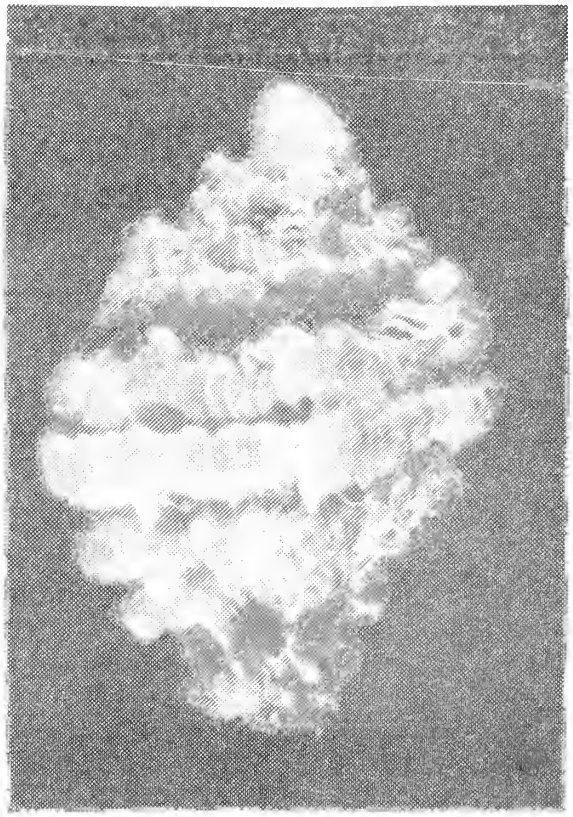


Fig. 1b Dorsal view

Favartia garrettii (Pease, 1868)

Garrett* (1857) originally named the species *Murex exigua*, and the original description of the shell stated the color as "whitish." There was no mention of whether the species' description was based on live or

* Andrew Garrett was an explorer, naturalist, and artist who lived and collected in Hawaii for many years. Little has been published about his life and contributions until a recent biography by Thomas (1979).

dead collected specimens or on the number of specimens used for the original description. The habitat was described as "pure shallow pools on the rocky coasts of Hawaii." The specimen pictured here, although dead collected, was found in like surroundings.

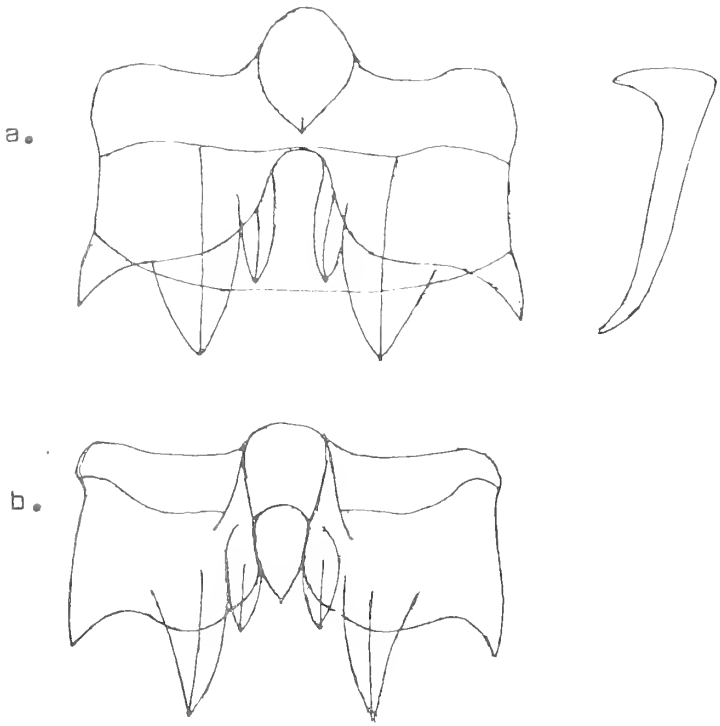
Pease (1868) changed the name to Murex garrettii since the original name was preoccupied (Murex exiguus Broderip, 1833). He also corrected the original Garrett name to Murex exiguus so that the gender of the genus and the species agreed. Pease stated the following: "Since described, a specimen nearly perfect has been found. Its color is dusky brown, transverse grooves reddish." This may indicate that the Garrett specimens were beach worn. Although many muricid species come in a variety of color forms, the evidence to date indicates that F. garrettii is a reddish brown shell, with the white form still in doubt.

Radwin and D'Attilio's description was influenced by their use of worn specimens. This is particularly evident in the description of the outer apertural lip, i.e. "thickened and nonerect; its inner surface is weakly spirally grooved, this imparting to the lip a weakly lirate appearance." The specimen pictured here shows a strongly lirate lip with well defined grooving on the inner surface.

The specimen pictured here is slightly larger than 4 mm. The excellent photographs were taken by David K. Mulliner, FESTIVUS staff photographer, and are a magnification of approximately 20X. The Garrett description states the length as five lines (assumed to mean 5 mm).

Fair (1976) is the earliest reference we could find in which the species was placed in the genus Favartia. Radwin and D'Attilio (1976) came to the same conclusion.

FAVARTIA GARRETTI
off Waikiki Hawaii, 10-45fm
U.S.N.M. 454202



While engaged in research for writing "Murex Shells of the World," specimens were borrowed from various institutions. From the U.S.N.M. specimens of Favartia garrettii were obtained which had the soft parts preserved. The radula was extracted and is here illustrated for the first time in Fig.2 a-c. The rachidian tooth shows its generic relationship to the other species of Favartia with known radulae. The rachidian bears a long, prominent central cusp, flanked by 2 cusps on each side--an outer larger cusp with a weaker, thinner cusp on its inner margin. The central cusp is carried on a strong, prominent and broad base with a solid lateral supporting structure. The latera teeth are simple elongate hooks, with a slight distal bend.

Fig. 2 Radular teeth of Favartia garrettii. a. Rachidian and lateral teeth. b. View of rachidian, with anterior portion tilted more towards the viewer than in a. c. Lateral view of rachidian tooth.

In researching this species, Pease's reference to the original description was found to be in error. The reference was "Proc. Calif Acad. vol i, p. 102." Garrett's description is in vol 1, p. 114. The incorrect page reference was repeated in Vokes (1971). It was corrected in the Literature Cited section of the Radwin and D'Attilio book, although not in the primary text.

ACKNOWLEDGEMENTS

We wish to acknowledge the help of Gale Sphon of the Los Angeles County Museum of Natural History and David Mulliner of the San Diego Museum of Natural History for their help in searching the literature and Dr. Hans Bertsch of the San Diego Museum of Natural History for his critical reading of this paper.

LITERATURE CITED

Broderip, W.J. 1833. Proc. Zool. Soc. London. Part II. p. 175.

Fair, R.H. 1976. The Murex book: an illustrated catalogue of Recent (Muricidae, Muricopsinae, Ocenebrinae). 1-136 pp., pls. 1-32.

Garrett, A. 1857. New species of marine shells of the Sandwich Islands. Proc. Calif. Acad. Sci. 1: 114-115.

Pease, W.H. 1868. Synonymy of marine gasteropodae inhabiting Polynesia. Amer. J. Conch. 4: 103-132.

Radwin, G.E. and A. D'Attilio. 1976. Murex shells of the world. Stanford Univ. Press, Stanford, Calif., 1-284 pp., pls. 1-32.

Thomas, W.S. 1979. A biography of Andrew Garrett, early naturalist of Polynesia: Part 1. The Nautilus. Vol. 93(1): 15-28.

Vokes, E.H. 1971. Catalogue of the genus Murex Linne (Mollusca: Gastropoda): Muricinae, Ocenebrinae. Bull Amer. Paleo. 61 (268): 1-141.

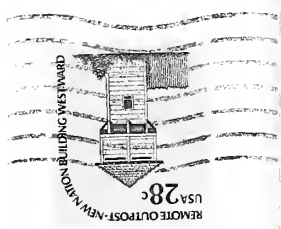
SAVE THE DATE! The annual Club Auction/Potluck will be on Saturday, April 14 at 6:00 P.M. at the Bradners' home. Details later. Your shell donations are needed for a successful auction. Bring your quality shells with as complete data as possible to a Club meeting or, if this is not possible, contact a board member and arrange for a pickup of you shell donations.

FOR YOUR INFORMATION

1. Library notice-- The Fall, 1978 Newsletter of the AMU contains a seven page list of the research activities of many well-known workers and institutions. For those interested, the library has available a copy for circulation.
2. DUES ARE DUE
3. Please notify the Club (address on masthead) when you change your address. It saves considerably on mailing costs.
4. Back issues of The FESTIVUS may be purchased for $1.00 per copy while supply lasts. Special issues may be ordered at $2.00 per copy.
5. Member(s) interested in helping with Club publicity please contact Hugh Bradner.

SAN DIEGO SHELL CLUB
[illegible]
3883 MT. ACADEMY AVE.
SAN DIEGO, CA. 92111

SAN DIEGO CA
PM
1979



Library - Acquisitions
#90105 Z0201
Smithsonian Institution
Washington, D.C. 20560

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO, BALBOA PARK
ROOM 104 7:30 P.M.

Vo. XI March 1979 No. 3

PROGRAM: Anthony D'Attilio will give an illustrated talk on The Coralliophilidae From Southeastern Japan

There will be a silent auction of shells and corals.

Bring your volutes for display for this evening's meeting.

Date: March 15. Time: 7:30 P.M. Room 104

FROM THE MINUTES: February 15, 1979

By KAREN HOGAN

The meeting was called to order at 7:50 P.M. Hugh Bradner introduced the evening's speaker, Phil Faulconer who gave a marvelous talk and slide show on a recent trip to Samoa and Tonga. (Article will follow in a future FESTIVUS, Ed.).

After Phil's presentation, there was a coffee break and a silent auction on corals which continued until the business meeting began.

The January and February minutes were accepted. An announcement of a volute display for the March meeting was made. Members were urged to bring their specimens to the meeting. On April 14 (at the home of Hugh and Marge Bradner) our annual Auction/Potluck will be held. Members are asked to gather their donations for the Auction. Any member of the Board will be glad to assist members by arranging for pickup of donations, etc. The specimens shouod have collecting data if possible.

Dues are payable now. To be included on the membership roster, dues must be in by the March meeting.

The Club approved unanimously the Board's recommendation to contribute $35. to The Veliger this year.

Don Mabery won the door prize and the meeting adjourned at 9:50 P.M.

IN MEMORIAM

With sorrow, we report the sudden passing of Norman Currin on February 24 of this year.

Norm was a charter member of the San Diego Shell Club and a beloved friend of all who knew him. He was active in Club affairs for many years, serving as president in 1964 and vice-president in 1968. He was on the committee that launched The FESTIVUS and was our treasured auctioneer for over ten years.

Norm collected extensively in the Panamic province, making many trips into Mexico. He was an accomplished diver and also dredged and collected intertidally. Crassispira (Monilispira) currani McLean & Poorman, 1971 was named for Norm.

We will miss his warmth and ready smile.

FOR YOUR INFORMATION

1. The Life Histories of Mollusks will be the theme of the joint meeting of the Western Society of Malacologists (WSM) and the American Malacological Union (AMU) in Corpus Christi, Texas on Aug. 5-11, 1979. Papers on any aspect of molluscan life histories will be considered for presentation. For further information contact David R. Lindberg, Center for Coastal Marine Studies, Applied Sciences, Univ. Of Calif., Santa Cruz, Calif., U.S.A., 95064.

2. WSM announces it will award a student research grant of $500. to an undergraduate or graduate student at a University or Marine Field Station, for the academic year 1979-80. "The grant is offered to initiate further research concerned with molluscs, in systematics, biology, ecology, paleontology or related fields." The deadline for applying is April 11, 1979.. For applications write to: Dr. Vida C. Kenk, WSM Committee on Student Grants, Dept. Biological Sciences, San Jose State University, San Jose, California 95192

3. DUES ARE DUE!! Notice that dues have been raised for the year due to increased costs. (Dues rates published on first page of each issue).

4. The Club will be exchanging publications with the Societé Belge de Malacologie. Their INFORMATIONS de la Societe Belge de Malacologie is printed quarterly and ARION, bimonthly. We will receive both in exchange for The FESTIVUS. Both these publications are in French and INFORMATIONS has interesting articles of scientific importance.

5. Back issues of The FESTIVUS may be purchased for $1.00 per copy while supply lasts. Special issues may be ordered at $2.00 per copy.

6. Please notify the Club when you change your address. It saves considerably on mailing costs. (Address on masthead)

PRELIMINARY ACCOUNT OF THREE GENERIC TAXA IN THE MURICACEAN FAMILY CORALLIOPHILIDAE

ANTHONY D'ATTILIO and HANS BERTSCH

Department of Marine Invertebrates
San Diego Natural History Museum
San Diego, California 92112

We have recently been informed by Dr. Henk K. Mienis (Hebrew University, Jerusalem) that several references of species and subspecies were not included in the Coralliophilidae Catalogue (D'Attilio, 1978). These corrections and additions will be published in a forthcoming issue of The FESTIVUS.

There are at least 27 generic-level taxa that have been considered members of Coralliophilidae. When critically evaluated it is apparent to our view that many of the genera are unnecessary and a burden on the literature, especially for a family of perhaps less than 200 valid species. The most abused (and overnamed) group of species is assignable to the genus Coralliophila H. & A. Adams, 1853. The genera we would synonymize because of their very minor distinctions from Coralliophila are the following; Pseudomurex Monterosato, 1872, Lepadomurex Coen, 1922, Latiromurex Coen, 1922 (misspelled Latimurex in the Catalogue), Fusomurex Coen, 1922, Coralliofusus Kuroda, 1953, Rhombothais Woolacott, 1954, and Orania Pallary, 1900.

The genus Coralliophila has the largest number of species in the family. This genus is characterized by its more or less fusiform shell, moderate canal, elevated spire, and scaly spiral cords of fine or coarse character.

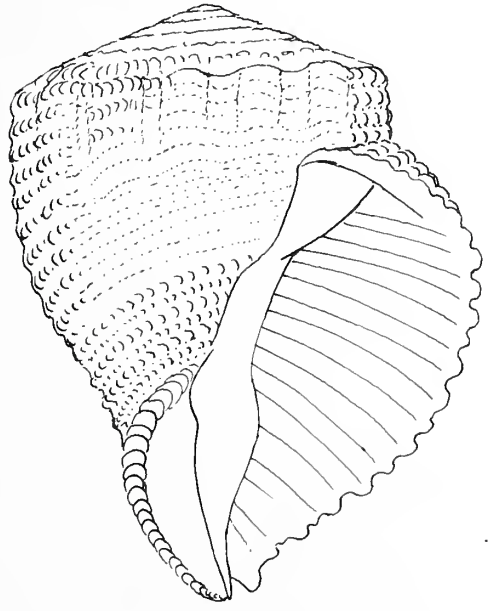


Fig. 1. Coralliophila neritoidea (Lamarck, 1816) Type of Coralliophila.

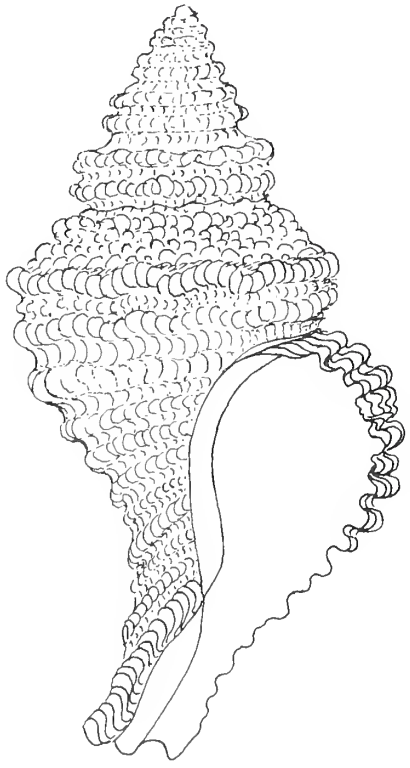


Fig. 2. Coralliophila meyendorffi (Calcara, 1845). Elongate form of Coralliophila.

The type species of the genus, C. neritoidea (Lamarck, 1816) (Fig. 1) is "atypical," in that it is squat (with a broad, open aperture and short canal), having a much lower spire in relation to the aperture length than is found among most species of Coralliophila (Fig. 2). These different forms are simply the extremes of an intergrading series. Separating genera at various stages along the continuum does not respect the biological variability of this species group, and artifically separates a closely related phylogenetic grouping.

The next most numerous genus, Babelomurex Coen, 1922, is distinguished from Coralliophila by the following traits: a prominent shoulder keel, often with posteriorly-curving spines; some species have secondary keels on the body or on the shoulder between whorls. Species with one spiny keel only at the shoulder (Fig. 3) should be considered members of the same genus as those species with more than one spiny keel on each whorl (Fig. 4). These spiny keels are simply the result of a greater elaboration of the texture and roughness of the coarse spiral cords (Fig. 5).

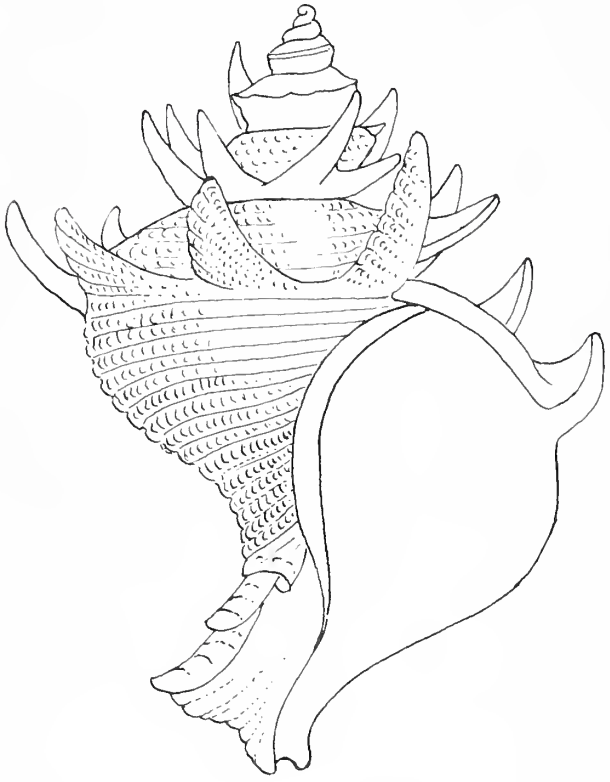


Fig. 3. Babelomurex deburghiae (Reeve, 1857). One spiny keel present only on the shoulder.

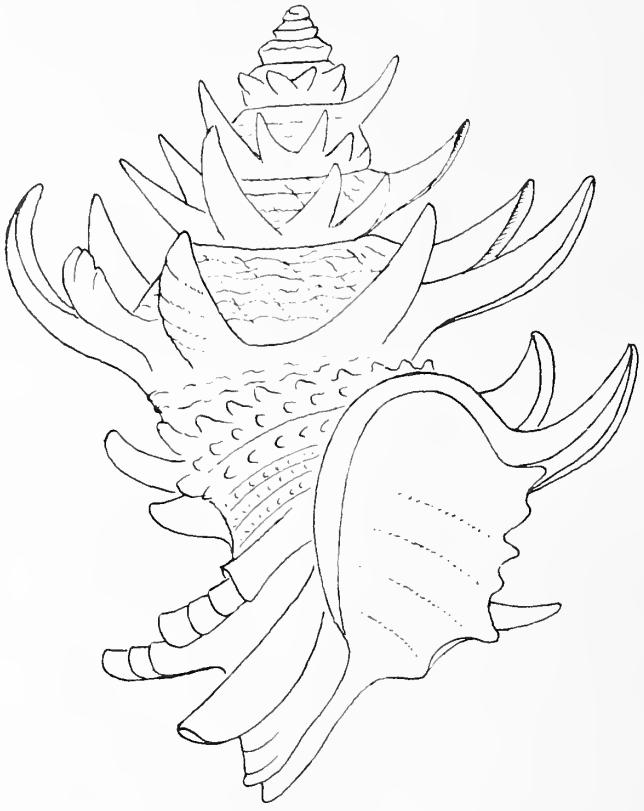


Fig. 4. Babelomurex pagoda (H. & A. Adams, 1853). More than one spiny keel present on the whorl.

The type species of Tolema Iredale, 1929, and Hirtomurex Coen, 1922, fall within the range of variation of Babelomurex, and these genera may be suppressed as synonyms.

Based on the morphology of its type species, Latiaxis Swainson, 1840, has been over-used. Too many species have been lumped into this genus.

The type, Latiaxis mawae (Griffith and Pidgeon, 1834) occurs in the Indo-Pacific and has a completely flattened spire (Fi. 6). The latter portion of the last whorl is detached from the shell (Fig. 7). The scabrous spiral cords are relatively minute and the shoulder has strongly recurved triangulate spines which often terminally rest on the shoulder. This is a small, but distinctive genus. Latiaxis pilsbryi Hirase, 1908, L. latipinnatus Azuma, 1961, and L. hayashi Shikama, 1966, are among the very few coralliophilids that may be confidently assigned to this genus. The South African Latiaxis kylix Barnard, 1959, has recently been cited as a subspecies of L mawae by Kilburn, 1973, but this species may eventually be completely synonymized with L. mawae.

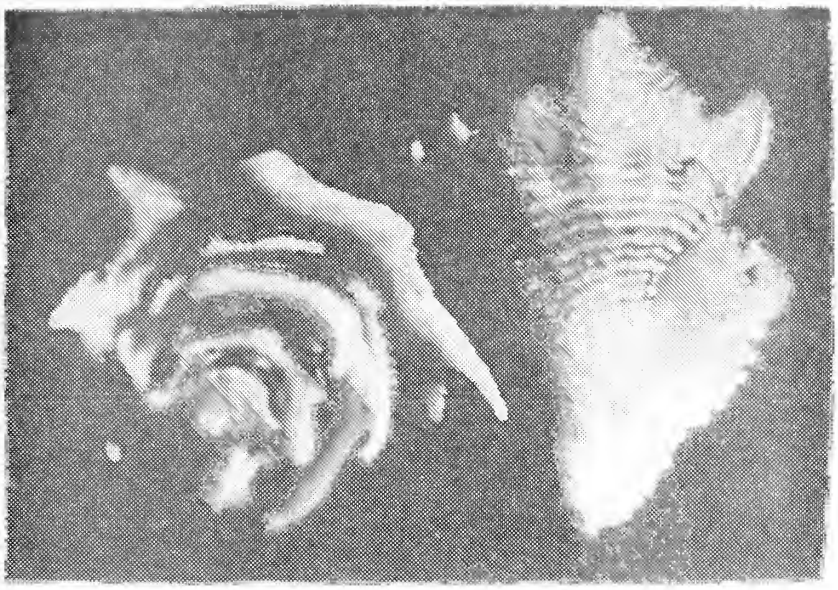


Fig. 5. Babelomurex japonica (Dunker, 1882) shows the high degree of texturing on the spiral cords, and the presence of several spiny keels.

In the above preliminary appraisal of a portion of the Coralliophilidae, 12 genera have been reduced to 3. We believe that the elimination of these genera clarifies much of the current confusion in classifying the Coralliophilidae.

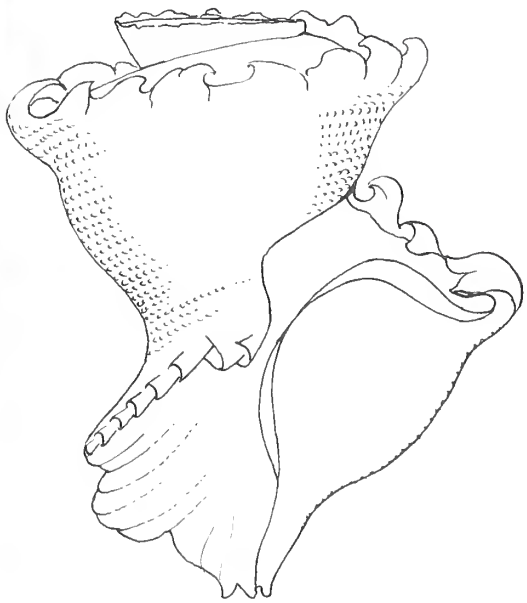


Fig. 6. Latiaxis mawae (Griffith & Pidgeon, 1834) Completely flattened spire.

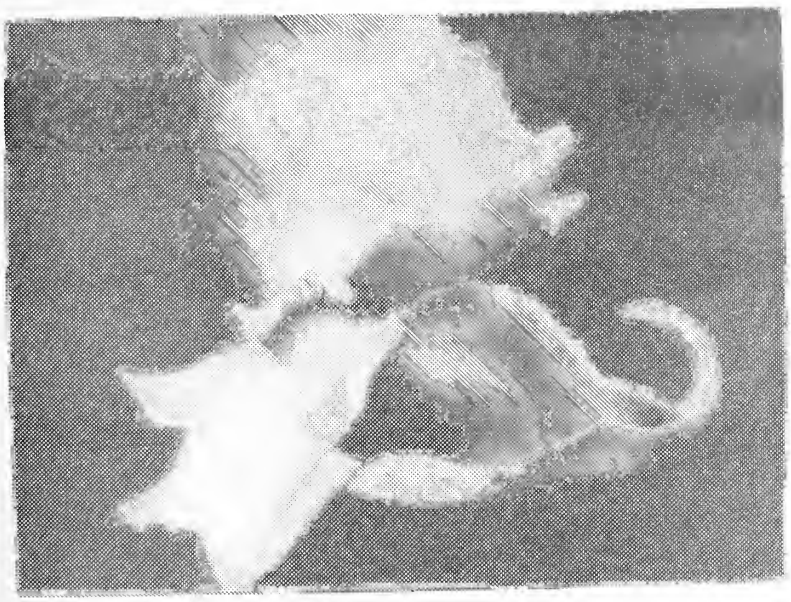


Fig. 7. Latiaxis mawae, showing the detached last whorl.

LITERATURE CITED

Adams, Henry, and Arthur Adams. 1853-1858. The genera of Recent Mollusca, arranged according to their organization. London. 3 vols.

Azuma, Masao. 1961. Descriptions of six new species of Japanese marine gastropoda. Venus, The Japanese Jour. of Malacology 21 (3); 296-303; 11 text figs. (15 August 1961)

Barnard, K.H. 1959. Contributions to the knowledge of South African marine Mollusca. Part II. Gastropoda: Prosobranchiata: Rhachiglossa. Ann. South African Mus. 45(1): 1-237; 52 text figs. (June 1959).

Calcara, P. 1845. Cenno Moll. viv. e fossili di Sicilia. Sicily. (not seen) (December 1845).

Coen, Giorgio Silvio. 1922. Del genere Pseudomurex (Monterosato 1872). Atti Soc. Italiana, Sci. Nat. Mus. Civico, Storia Nat. Milano 16: 68-71; plt. 2.

D'Attilio, Anthony. 1978. A catalogue of Coralliophilidae. The FESTIVUS 10(10): 69-96. (October 1978).

Dunker, Guilielmo. 1882. Index molluscorum maris Japonici. Cassellis Cattorum, Theodore Fischer. vii + 301; 16 plts.

Griffith, Edward, and Edward Pidgeon. 1834. The Mollusca and Radiata. London, Whittaker and Co. viii + 601 pp.; 40 + 20 plts.

Hirase, Y. 1908. Appendix--On Japanese Marine Mollusca (II), with the description of new species of Muricidae and Buccinidae. The Conchological Magazine (Japan) 2(12): 69-74 (English); 387-401 (Japanese); plts. 41-43. (December 1908).

Iredale, Tom. 1929. Mollusca from the continental shelf of Eastern Australia. No. 2. Records Australian Mus. 17(4): 157-189; plts. 38-41. (4 September 1929).

Kilburn, R.N. 1973. Notes on some benthic Mollusca from Natal and Moçambique, with descriptions of new species and subspecies of Calliostoma, Solariella, Latiaxis, Babylonia, Fusinus, Bathytoma and Conus. Ann. Natal Mus. 21(3): 557-578; 17 text figs. (30 September 1973).

Kuroda, Tokubei. 1953. New genera and species of Japanese Rapidae. Venus, The Japanese Journ of Malacology 17(3): 117-130; 8 text figs. (May 1953).

Lamarck, J.B.P.A. de M. de. 1816. Tableau encyclopédique et methodique des trois régnes de la nature. Paris.

Monterosato, T.A. di. 1872. Notizie intorno alle Conchiglie Mediterranee. Palermo, 61 pp.

Pallary, Paul. 1900. Coquilles marines du littoral du Département D'Oran. Jour. de Conchyl. 48(3): 211-422; plts. 6-8; 19 text figs. (25 October 1900).

Reeve, Lovell. 1857. Descriptions of seven new shells from the collection of the Hon. Sir David Barclay, of Port Louis, Mauritius. Proc. Zool. Soc. London 25: 207-210; plts. 37-38.

Shikama, Tokio. 1966. On some new Latiaxis and Coralliophila in Japan. The Venus 25(1): 21-26; 2 plts. (June 1966).

Swainson, William. 1840. A treatise on malacology; or the natural classification of shells and shell-fish. London: Longman, Brown, Green and Longmans. viii + 419 pp.; 130 text figs.

Woolacott, Lee. 1954. New shells for New South Wales. Proc. Royal Zool. Soc. N.S. Wales 1952-53: 37-39; plt. iii. (24 May 1954).

EMERSON & D'ATTILIO PAPER ON MURICACEAN GASTROPODS PROVIDES NAMES FOR SIX SPECIES PICTURED IN A PREVIOUS FESTIVUS SERIES

CAROLE M. HERTZ, Editor

During the past two years, Anthony D'Attilio, Assistant Curator of Marine Invertebrates at the San Diego Natural History Museum, has written for The FESTIVUS on "New or Poorly Known Coralliophilidae and Muricidae From the Western Pacific" in a three part series (Part I Vol. IX, No. 10: 70-73; Part II, Vol. IX, No. 11: 76-79; Part III, Vol. X, No. 1: 1-9 [84-92]). Since these articles appeared, seven of the species featured and pictured in The FESTIVUS have been named, four by Emerson and D'Attilio, 1979.

William K. Emerson and Mr. D'Attilio, in their recent article, "Six New Living Species of Muricacean Gastropods," The Nautilus, Vol. 93 (1): 1-10, 21 figs, Jan. 10, 1979, give a supplementary description for Murexiella martini Shikama, 1977, and illustrate and translate the original description of Dermomurex neglecta (Habe & Kosuge, 1971), besides naming six new muricacean species.

In Vol. IX, No. 10: 71 of The FESTIVUS the top species is Favartia guamensis Emerson & D'Attilio, 1979. The bottom two photos are of Favartia dorothyae Emerson & D'Attilio, 1979, named for Dorothy Janowsky of New York and a Club member. On p. 72 the two sets of photos are of Murexiella martini (Shikama, 1977). In Vol. X, No. 1:90 the top species is Siphonochelus radwini Emerson & D'Attilio, 1979 named for our late friend and curator, George Radwin. The bottom species is Pteropurpura benderskyi Emerson & D'Attilio, 1979 named for Israel Bendersky of New York. The Jan. 10, 1979 issue of The Nautilus will be in the Club library.

On p. 89 of Vol. X the Chicoreus pictured has also been named since the FESTIVUS series appeared. It is Chicoreus orchidflorus (Shikama, 1973) and was named in the article, "Description of New Marine Gastropoda from the East and South China Seas," Sci. Rep. Yokohama Univ. Sec. 2, No. 20.

REMINDER

The Club's Annual Auction/Potluck will be held on Sat. April 14 at the home of Marge and Hugh Bradner. (Map will be in the April issue). Festivities begin at 6:00 P.M.

The Auction is the Club's ONLY fundraiser. Its proceeds form the major part of our annual budget and support our donations to scientific organizations, our social events and The FESTIVUS. Donate generously and either bring your shell donations to the March meeting or contact a Board member to arrange for pickup of your shells. Specimen quality shells with data are preferred. For those who have no shells to donate--Come anyway and BUY!!!

MINUTE SHELLS

By JULES HERTZ

Department of Marine Invertebrates
San Diego Museum of Natural History
San Diego, California 92112

On 26 December 1978, the shell pictured below was collected by Carole M. Hertz at Solana Beach, California. The specimen, dead collected, was found intertidally attached to an anemone on the reef at the north end of Solana Beach Park. The shell was new to us, and after an extensive search was identified as the turrid, Elaeocyma hemphillii (Stearns, 1871). I found a second shell of the same height, but more slender, at the same location on 11 February 1979.

The shell pictured here is approximately 11 mm in height and 3.4 mm in maximum diameter. The excellent photograph was taken by David K. Mulliner, FESTIVUS staff photographer, and shows the shell at a magnification of 8.5X. The shell is smooth, slender, polished, and orange-tan in color. It has oblique ribs which are conspicuous even on the body whorl. The sinus is sutural, deep, and calloused. The canal is very short. The shell is marked by a series of fine, white, widely spaced spiral striations which parallel the sutures.

Elaeocyma hemphillii (Stearns, 1871)

Since its initial naming, this species has been assigned to a number of different genera. Stearns assigned it to Pleurotoma Lamarck, 1799. This name, meaning "notch-side" was a catch-all category of the time. As noted in Keen(1971), it was nearly a century later that malacologists realized that Turris Röding, 1798, had priority. The species was assigned by Tryon (1884) to the genus Drillia Gray, 1838, which had earlier been considered a subgenus of Pleurotoma. In succeeding years, the species has been bounced back and forth among the genera Clavus Montfort, 1810; Cymatosyrinx Dall, 1889; and Elaeocyma Dall, 1918. The primary difference of opinion among authors was with Cymatosyrinx and Elaeocyma and whether to assign them generic or subgeneric status.

Dall (1918) stated "the light-colored species with an oily gloss, thin shells, and prominent riblets usually crossed by rather widely spaced spiral striations will take the new name of Elaeocyma Dall. This group appears to be peculiar to the Pacific coast of America. Drillia empyrosia Dall may be taken as type and D. unimaculata Sowerby, hemphilli Stearns and several others belong to it. Cymatosyrinx Dall, 1889, based on Pleurotoma lunata Lea will cover the thin-shelled light-colored species of its type." However, Dall confused the issue in 1921 by making Elaeocyma a subgenus of Cymatosyrinx. At the same time, he cited incorrectly the year for establishing Elaeocyma as 1917.

Burch (1946) quotes A.M. Strong on the problem as follows;""I consider Cymatosyrinx a good genus, but do not think it contains any species from

San Diego or north. Clavus might be used as a subfamily. The typical genus s.s. can hardly be used for any west coast species. Elaeocyma Dall is a good genus with but the one species from California. The genus Imaclava Bartsch is very similar if not identical. Hemphilli Stearns and halocydne Dall are the northern representatives of a large southern group. They probably belong in a subgenus under Elaeocyma, but I can find no name for it. They are much smaller and more slender than the typical form."

McLean in Keen(1971) considers Elaeocyma Dall, 1918, as a genus and states the following: "Elaeocyma has the short canal and carinate second nuclear whorl of Cymatosyrinx Dall, 1889, but the type species and other related species of Cymatosyrinx from the Florida Pliocene have a beaded subsutural cord and lack spiral sculpture altogether; no eastern Pacific species are related."

Grant and Gale (1931) considered Elaeocyma hemphillii extremely variable. They placed it in the genus Clavus and listed the following as variants with the type localities given in parenthesis: plicatellus (Panama Bay), ferminianus (Point San Fermin, Lower California), palmeri (head of the Gulf of California), attalia (west coast of Mexico, probably near Mazatlán), arbela (Scammon's Lagoon, Lower California), and aeolia (Cape Tepoca, Gulf of California). The type locality of E. hemphillii is Todos Santos Bay, Baja California Sur.

Burch reports collecting data for this species from a number of sites in California and Lower California, i.e. dredged off Redondo Beach and Malaga Cove, dredged in great abundance at Todos Santos Bay in approximately 10-15 fms., taken littoral from the sand bars in the Estero below Ensenada, and off Santa Monica, Ca. in 15 fms. (Burch); San Diego in 10 fms. (Kelsey); San Pedro in 10 fms.; Estero Todos Santos Bay (Lowe); and Scammon's Lagoon (Hemphill). The reported range for Elaeocyma hemphillii is Santa Barbara to the Gulf of California.

The original orthography of the species is hemphillii the proper genitive ending based on the Latinization hemphillius. The International Code of Zoological Nomenclature (ICZN) dissuades the use of the -ii ending when currently naming shells, but wisely prohibits the changing of the original spelling of a species' name except in specific extraordinary circumstances.

SYNONYMY

Pleurotoma (Drillia) hemphillii Stearns, Conchological Memoranda, No.7, p.2, separately printed, Journal & Argus Print, Petaluma, Ca., August 28, 1871; Proc. Calif. Acad. Sci., Vol. 5, p. 80, pl. 1, fig. 3, 1873; Smith, Veliger, Vol. 18, No. 4, p. 410, 1976, (facsimile reproduction of original description).

Drillia hemphilli Stearns, Tryon, Man. Conch., Vol. 6, p. 185, pl. 13, fig. 49, 1884; Arnold, Mem. Calif. Acad. Sci., Vol. 3, p. 204, pl. 5, fig.8, 1903.

Elaeocyma hemphilli Stearns, Dall, Proc. U.S. Nat. Mus., Vol. 54, p. 317, 1918; E.K. Jordan, Proc. Calif. Acad. Sci., Ser. 4, Vol. 15, p. 245, 1926; J.Q. Burch (ed), Proc. of Conch. Club So. Calif., Vol. II, No. 62, p. 8, 1946.

Cymatosyrinx (Elaeocyma) hemphilli Stearns, Dall, Bull. 112, U.S. Nat Mus., p. 69, 1921; Oldroyd, Stanford Univ. Publ. Geol., Vol. 2, Pt. 1, p. 69, 1927; Abbott, American Seashells, 2nd Ed., Van Nostrand Reinhold Co., p. 276, 1974.

Clavus (Cymatosyrinx) hemphilli (Stearns), Grant & Gale, Mem. San Diego, Soc. Nat. Hist., Vol. 1, p. 577, pl. 26, fig. 8, 1931.

OTHER LITERATURE CITED

Keen, A. Myra. 1971. Sea shells of tropical West America, Stanford Univ. Press, 1064 pages.

ACKNOWLEDGEMENT

I wish to acknowledge the help of Dr. Hans Bertsch, curator of marine invertebrates, of the San Diego Museum of Natural History for the critical reading of this article.

NEW MEMBERS

PHELAN, Peggy
Box 708
USNF Subic Bay
FPO San Francisco, Ca. 96651

FRIED, Jeff
3883 Jewell St. #8-17
San Diego, Ca. 92109

SMITH, M/M Franklin
872 La Jolla Rancho Rd.
La Jolla, Ca. 92037

CHANGES OF ADDRESS

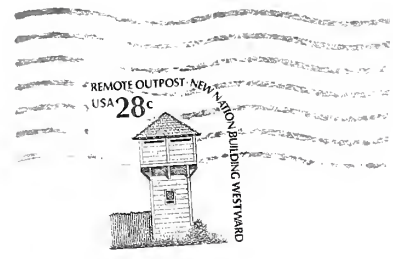
SMITH, John AQC
AIMD Box 24
USS Coral Sea CV 43
FPO San Francisco, Ca. 96601

BROSIUS, George & Doris
159 14 0746
Dep. Mail. Sect., Box 11
APO San Francisco, Ca. 96301

NELSON, John & Susan
4561 Utah St. Apt. 1
San Diego, Ca. 92116

SAN DIEGO SHELL CLUB
% C. HERTZ
3893 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO, CA 921
PM
2 MAR
79



Library - Acquisitions
#90105 Z 0201
Smithsonian Institution
Washington, D.C. 20560

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO, BALBOA PARK
ROOM 104 7:30 P.M.

President:.....Hugh Bradner
Vice President:.....Sandie Seckington
Recording Secretary:.....Karen Hogan
Corresponding Secretary:...Jacquie Berzins
Treasurer:.....Walter Robertson
Editor:.....Carole M. Hertz

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00; Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave. San Diego, Ca. 92111

Vol. XI April 1979 No. 4

SEE YOU AT THE AUCTION/POTLUCK!!
(There is no regular meeting this month).
Date: April 14, 1979 Time: 6:00P.M. -? Place: The Bradners' home

For details and directions, see map on last page of this issue.

If you have shells for the Auction but have been unable to come to a meeting, contact a board member to arrange for pickup of your shells.

FROM THE MINUTES OF THE MARCH MEETING

KAREN HOGAN, Secretary

The regular meeting of the San Diego Shell Club was called to order by Vice President, Sandie Seckington shortly after 7:30 P.M. Guests and visitors were introduced and welcomed. In addition to our on-going silent auction of coral, it was Volute Night and many members brought their spectacular volutes for all of us to view.

Anthony D'Attilio was our speaker on Coralliophilidae, sharing with us the excitement of classifying and naming what seemed to be a plethora of new shells. The photography, some of which was done by Barbara W. Myers, was beautiful, capturing the delicate detail of these species.

After a brief coffee break, the business portion of the meeting was called to order. The main order of business was the plans and preparation for the Auction on April 14 at 6.00 P.M. The Minutes, as published in The FESTIVUS were approved as written. Members were reminded that dues were payable now for a last chance to be included on the roster.

THE SAN CARLOS RECTANGLE

FORREST AND ROY POORMAN

15300 Magnolia, Westminister Ca. 92683

Guaymas, Sonora, Mexico is on the main west coast Mexican highway, 275 miles below the border at Nogales, Arizona. Our family first discovered it in 1953, the year the highway was completely paved. Bahia San Carlos, or the "San Carlos Region," is thirteen miles by paved road west of Guaymas.

Nearly every Christmas and Easter vacation until 1973 has seen us head south like migrating birds. Since 1973, we have spent about five months a year at the Shangri La Trailer Park, on a small peninsula near the estero. At first there was only a winding dirt track out to the estero and the drive took about an hour. Camping was free in the chaparral where one could become acquainted with skunks, cattle, and cardinals flashing through the bushes. There were, and still are, miles of beach to walk, clear and usually calm water in which to swim and dive, and many rocky reefs to explore for shells

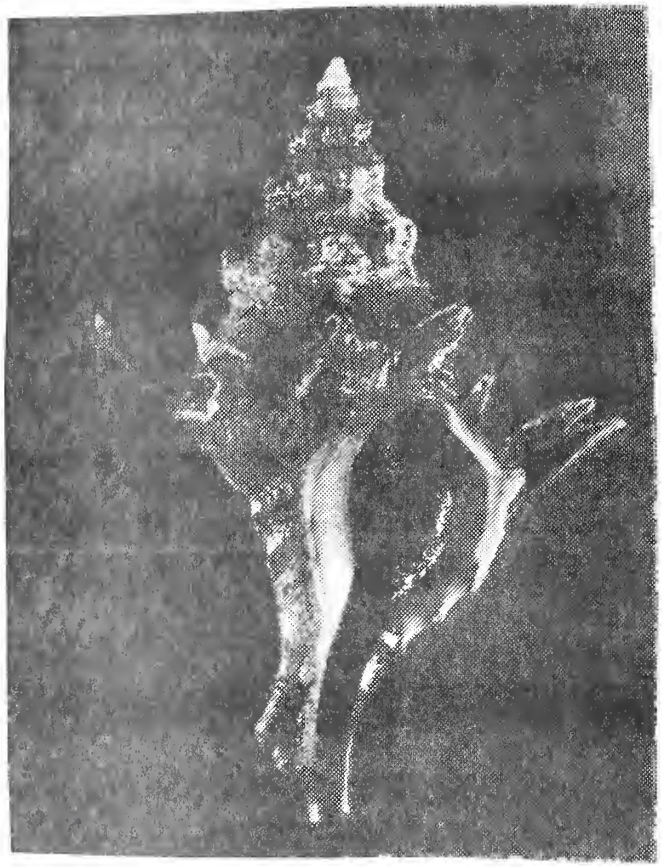
Many changes have occurred in the 25 years since our first visit. Most of the chaparral is gone replaced by hotels, condominios, and many low white houses along the shore and on the hills around the estero. A beautiful country club has recently been completed in an area surrounded by stark red sonoran hills with the sparkling blue Gulf of California spread out below. The trailer park was the first facility to be built at San Carlos in 1963. At first it consisted of a wash house and sites for several dozen trailers. Now it will accommodate 400 vehicles and stretches half way up the hill to the west.

There is much to do at the Shangri La Trailer Park in San Carlos. But from the very beginning, collecting mollusks became our excuse for returning here in preference to any other spot. By 1960 we had samples of just about everything that was to be found intertidally. When some of the more well-known collectors of that period began to mention and display species they were getting by diving and dredging, we went offshore. At first we tried diving but were not really strong enough as swimmers to go very deep. So we borrowed a dredge and put out in a small twelve foot boat. From that first Christmas trip of nine days, we returned with 400 species new to us. Since that time we have made nearly 5,000 hauls, always with small, hand operated equipment. Many of our attempts have resulted in empty baskets; but like the machines at Las Vegas, some paid off with fantastic thrills, including 8-9 new species and another dozen still not described.

What we refer to as 'The San Carlos Rectangle' is an area 2 miles wide and 3 miles long, stretching from a rocky shore at the foot of Tetas de Cabra due south for 3 miles. Out there the water is 120 meters deep and the bottom has leveled off. At this depth, the bottom is silty mud and the speciation is very low and uninteresting. The most rewarding results we have had over the past three years have been at depths of 80-100 meters. The rectangle includes every kind of habitat except the back-bay mud flat. The bottom is changing with each of our visits because of storms and strong tidal currents. Reefs vanish and become sand hills while sand and mud wash away to uncover more rocks. Because we have had many opportunities over the past 25 years to sample the area, we know a great deal about the rectangle and the animals that live there.

Each species in our collection is matched with a card showing the history and pertinent data of each lot. This file contains records of

nearly 1200 mollusks identified as living in the rectangle.



Trophon sorenseni Hertlein & Strong, 1951
Dredged 100 m., San Carlos Rectangle

Cancellaria tessellata
Sowerby, 1832
Dredged 100 m., San Carlos Rect.

We have learned from intense investigation of this area, the following:

1. Many species thought to be local in occurrence may actually be much more widely distributed geographically. Species described long ago from such places as Paita, Peru and the Galapagos Islands are living in the rectangle.
2. Similarly, many species thought to occur intertidally or in shallow water may actually be more common offshore. An example is Cyphoma, which seems to occur wherever the soft corals grow. In our collection Cyphoma is most common at 100 meters.
3. Species react differently to the effects of pressure. Cypraea from 60 meters are only about 1/3 the size of intertidal specimens, while Cyphoma seem to be at their largest at 100 meters.
4. Whole populations seem to appear in cycles of 6-7 years. We don't know why but speculate that it may have something to do with the food chain. We have observed that when the algae are very scarce the small species that are found on them are gone; and the larger species also slowly disappear. But when the algae become abundant, all the familiar species reappear.

We are going back to the rectangle this spring and next fall and hope to have some more exciting experiences in the San Carlos Rectangle.

MINUTE SHELLS

JULES HERTZ
Department of Marine Invertebrates
Natural History Museum
San Diego, California 92112

Specimens from the Family Caecidae found in Southern California and Baja California were featured in the January 1979 FESTIVUS. This month, through the kindness of Bert Draper, we feature additional species of the genera Caecum Fleming, 1813, Fartulum Carpenter, 1857, and Elephantulum Carpenter, 1857. Original photography and shell identifications were courtesy of Bert Draper. The black and white pictures below were made from the original 35 mm colored slides by David K. Mulliner, FESTIVUS staff photographer.

Figure 1 shows six species of Caecidae obtained from grunge dredged in water from 5 to 15 fathoms deep from Puertocitos to San Luis Gonzaga Bay, Baja California, Mexico between the peninsula and the offshore islands. The grunge was taken in July 1969 by the Chamizal II expedition (News of the Western Association of Shell Clubs, Oct. 1969).

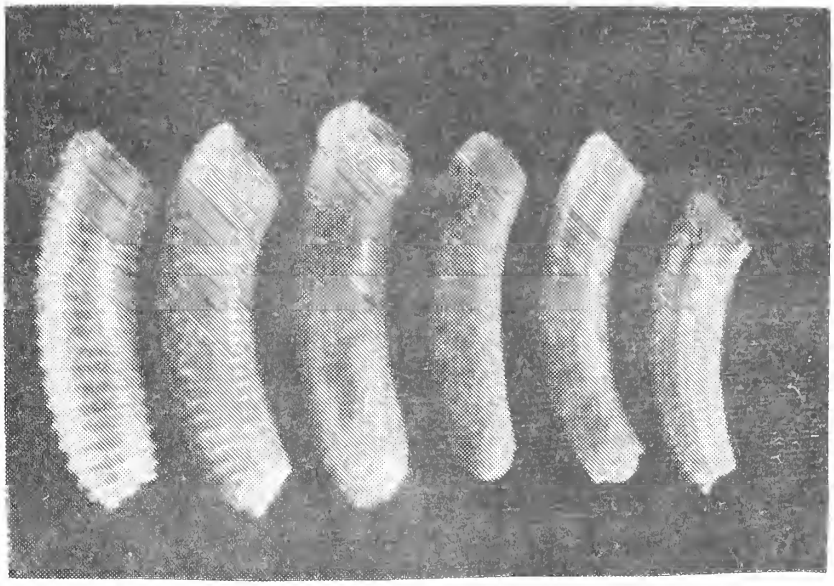


Figure 1. Caecidae from Chamizal II Dredgings. Left to right:-
Caecum undatum Carpenter, 1857;
Caecum semilaeve Carpenter, 1857;
Fartulum (?)dextroversum (Carpenter, 1857);
Fartulum glabriforme (Carpenter, 1857);
Elephantulum* heptagonum (Carpenter, 1857).
Largest specimen is 3.6 mm. Chamizal II Expedition, July 1969.

Figures 2 and 3 demonstrate some of the variability of Elephantulum heptagonum. Both specimens of Figure 2 were collected by the Chamizal II Expedition. Both have eleven axial ribs, but only one has white color zones. Figure 3 shows two specimens of the same species; the one with eleven axial ribs was taken at Santa Rosalia, Baja California, while the one with the nine axial ribs was taken west of San Luis Gonzaga, Baja California.

Figure 4 shows three specimens of Fartulum (?)farcimen (Carpenter, 1857), all of them taken during the Chamizal II Expedition. Again the variability is significant.

*Identified by Bert Draper as Elephantanellum. See discussion in FESTIVUS,, Jan. 1979.

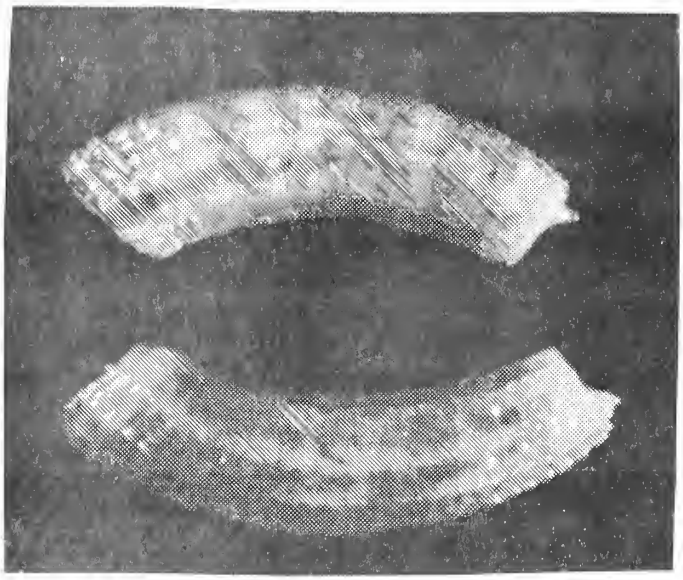


Figure 2. Elephantulum heptagonum Carpenter, 1857. Largest specimen is 2.4 mm.. Chamizal II Expedition, July 1969.

Figure 3. E. heptagonum Specimen with 11 axial ribs taken in 1970 at Santa Rosalia, B.C. Specimen with 9 axial ribs taken in 1969, west of San Luis Gonzaga, B.C.

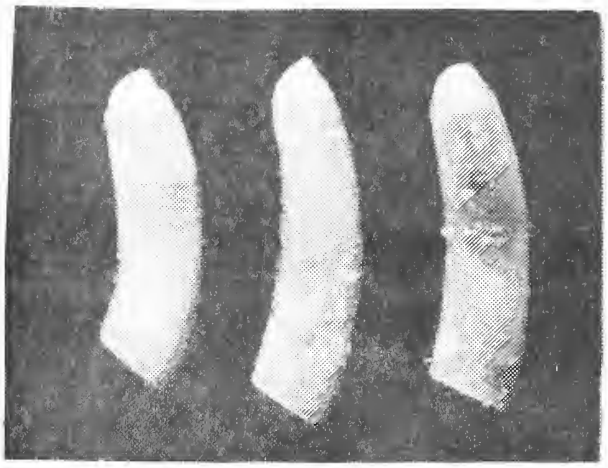


Figure 4. Fartulum (?)farcimen (Carpenter, 1857) Chamizal II Expedition, July 1969.

Identifying species of Caecidae from the Gulf of California, Mexico is an extremely difficult task. I am indebted to Bert Draper for his courage in providing identifications for the above shells. Bert had some reservations about the accuracy of the identifications of Fartulum dextroversum and Fartulum farcimen. In describing the genus Fartulum, Carpenter stated, "This group is named from the general resemblance in form to a little sausage. Some species however approach the long tapering Elephantulum, while others are approached by the ringed Anellum". Keen (1971) gives the distinguishing features of Fartulum as smooth, relatively small, and having a cup-shaped apical plug. The F. (?)dextroversum of Figure 1 and the F. (?) farcimen of Figure 4 do not meet these latter requirements. However, the illustrations of the shells described by Carpenter (Brann, 1966) show great variations in the shape of the apical plugs of F. dextroversum and F. farcimen. Also in the latter case, there is great variability in the

smoothness of the shells. The latter species generally, but not always, develops obscure rings near the aperture. The shells pictured by Brann show pronounced wrinkling.

Literature Cited

Brann, Doris C. 1966. Illustrations to "Catalogue of the Collection of Mazatlan Shells" by Philip P. Carpenter. Paleontological Research Institute, Ithaca, New York. 111 pp., 56 pls. (April 1).

Carpenter, P.P. 1857. Catalogue of the Collection of Mazatlan Shells in the British Museum: collected by Frederick Reigen....London (British Museum), pp. i-iv + ix-xvi + 552 (Aug. 1, fide Sherborn, 1934). Reprinted Paleont. Res. Inst., 1967.

Gemmell, J. 1969. Dredging by Shrimpboat. News of the Western Association of Shell Clubs (San Diego Shell Club). Vol. 10, No. 4. (Oct. 1).

Hertz, J. 1979. Minute Shells. FESTIVUS. Vol. XI, No. 1 (Jan.).

Keen, A. Myra. 1971. Sea Shells of Tropical West America. Stanford Univ. Press. 1064 pages.

LIBRARY NOTES

BARBARA W. MYERS, Librarian

The Library has just purchased the Reprint of Philip P. Carpenter's 1857 "Catalogue of the Collection of Mazatlan Shells in the British Museum" and the "Illustrations to 'Catalogue of the Collection of Mazatlan Shells' by Philip P. Carpenter" compiled by Doris C. Brann. These volumes were published by the Paleontological Research Institute, Ithaca, New York; the Catalogue in 1967 and the Illustrations in 1966.

During the years 1851-1857 Philip P. Carpenter separated approximately 700 species from the Reigen Collection to illustrate the fauna of Mazatlan. He arranged 8873 specimens showing species variability, mounted them on glass tablets and donated this Collection to the British Museum. It is still on deposit there today and available for study. His 522 page Catalogue was written describing and annotating these species, 255 of which were newly described.

The Catalogue contained no illustrations although Carpenter himself had made nearly 1000 drawings. It was not until 1966 that these drawings were finally published and made available as a supplement to the Catalogue.

The Library has also just purchased "Mollusks of the Tropical Eastern Pacific Particularly from the Southern Half of the Panamic Pacific Faunal Province (Panama to Peru) - Panamic-Pacific Pelecypoda" by Axel A. Olsson, published by the Paleontological Research Institution, Ithaca, New York in 1961. This 574 page descriptive work containing 86 plates has been an extremely valuable reference for many years. This and the Carpenter volumes are important additions to our library literature on the Panamic province.

FOR YOUR INFORMATION

1. Member, Ruth Greenberg's Tidepool Gallery is having its Second Annual Rare Shell Show from May 5 to May 13. In addition to a "display of prize-winning world-wide specimen shells on loan to the Tidepool... There will also be a rare opportunity to purchase specimens from the famous Stix collection...."

2. The Conchologists of America Bulletin, newsletter of the C.O.A., will now be under the Editorship of Richard Goldberg of 49-77 Fresh Meadow Lane, Flushing, N.Y., 11365. The Bulletin was formerly edited by Tom Rice. It will now be put out as a quarterly with many new and exciting features." Submit articles, newsnotes etc. to Richard Goldberg.

SAN DIEGO SHELL CLUB MEMBERSHIP LIST 1979

Ames, Clifford H.
Route 1, Box 99A
Eureka Springs, Ark 72632

Baily, Joshua
4435 Ampudia Drive
San Diego, Cal 92103

Bertsch, Judi & Hans
11613 La Colina Road
San Diego, Cal 92131
566-4485

Berzins, Jackie & Aivars
32592 Captain's Galley
Avon Lake, Ohio 44012

Bibbey, Joe
490 Citrus Avenue
Imperial Beach, Cal 92032
423-5133

Bradner, Marge & Hugh
1867 Caminito Marzella
La Jolla, Cal 92037
459-7681

Bratcher, Twila
8121 Mulholland Drive
Hollywood, Cal 90046

Brewer, Blanche & Norval
3614 Roselawn Avenue
San Diego, Cal 92105
282-0148

British Museum of Natl History
c/o Audrey Meenan, Serials Dept.
Cornwall Road
London England SW7-5BD

Brosius, Doris & George
159 14 0746
Dep. Mail Sect., Box 11
APO, San Francisco, Cal 96301

Burch, Beatrice L.
236 Kuuhoa Place
Kailua, Hawaii 96734

Burch, Mrs. John Q.
1300 Mayfield Rd, Apt 61-L
Seal Beach, Cal 90740

Burchard, Carol
c/o 1137 Prospect Street
La Jolla, Cal 92037
459-6858

Chace, Emery
29661 S.Western Ave, Rm 51
San Pedro, Cal 90732

Closson, Fred
5750 Amaya Drive #24
La Mesa, Cal 92041
462-6923

Clover, Phillip
P.O.Box 83
Glen Ellen, Cal 95442

D'Attilio, Rose & Tony
2415 29th Street
San Diego, Cal 92104
281-9731

De Hahn, Lynn & Ken
623 5th Avenue
Chula Vista, Cal 92010
427-5925

Delaware Museum Natl History
Box 3937
Greenville, Del 19807

Draper, Betram C.
8511 Bleriot Avenue
Los Angeles, Cal 90045

Evans, Roger
1900 Camino de la Costa #1
Redondo Beach, Cal 90277

Everson, Gene
1660 S.W.27th Avenue
Ft. Lauderdale, Fla 33312

Faulconer, Heidrun & Phil
P.O.Box 82632
San Diego, Cal 92138
222-8082

Fisichella, Melba
7873 Forrestal Road
San Diego, Cal 92120
583-2561

Fernandes, Francisco
C.P. No. 1038
Luanda
Republic Popular Angola

Fried, Jeff
3883 Jewel Street, #B-17
San Diego, Cal 92109

Gemmell, Joyce
150 S. Anza, Space 47C
El Cajon, Cal 92020
447-8004

Goldberg, Richard
49-77 Fresh Meadow Lane
Flushing, New York 11365

Good, Barbara & Frank
3142 Larga Court
San Diego, Cal 92110
222-5605

Goosen, Dorothy & Bob
59 Bayside Village
Newport Beach, Cal 92660

Greenberg, Ruth
c/o 22762 Pacific Coast Hiway
Malibu, Cal 90265
213-456-2551

Haigh, Marilyn & Ernest
6533 Orangewood Avenue
Cypress, Cal 90630

Hanselman, Virginia & George
5818 Tulane Street
San Diego, Cal 92122
453-3019

Hertz, Carole & Jules
3883 Mt. Blackburn Drive
San Diego, Cal 92111
277-6259

Hewitt, Susan J.
Box 605, Yale Station
New Haven, Conn 06520

Hogan, Karen
2736 Worden Street
San Diego, Cal 92110
223-5968

Janowsky, Dorothy
c/o 946 Ralph Avenue
Brooklyn, New York 11236

King, Harriett & Frank
859 E. Vista Way
Vista, Cal 92083

King, June & Bob
4269 Hawk Street
San Diego, Cal 92103
296-0574

Lerner, Martin
64 Thompson Avenue
Oceanside, New York 11572

Levine, Anita & Morris
139-62 Pershing Crescent
Jamaica, New York 11435

Mabry, Billee & Don
6333 La Jolla Blvd, #171
La Jolla, Cal 92037
459-1087

Macquin, Hazelle
437 Douglas Street
Salt Lake City, Utah 84102

Martin, Clifton & Clifford
324 Kennedy Lane
Oceanside, Cal 92054
757-1528

Michel, Nola & John
4758 Mt Cervin Drive
San Diego, Cal 92117
278-9088

Minor, Michael
Fleacts Det., Box 556
FPO, Seattle, Wash 98761

Mulliner, Margaret & David
5283 Vickie Drive
San Diego, Cal 92109
488-2701

Myers, Barbara & John
3761 Mt Augustus Avenue
San Diego, Cal 92111
279-9806

Nelson, Susan & John
4561 Utah Street, #1
San Diego, Cal 92116
282-4764

Pelton, Don
3634 Kettner Blvd, #5
San Diego, Cal 92101

Perrin, Marilyn & Bill
2947 Luna Avenue
San Diego, Cal 92117
272-1285

Phelan, Peggy
Box 70B
USNF Subic Bay
FPO, San Francisco, Cal 96651

Pisor, Jeanne & Don
10373 El Honcho Place
San Diego, Cal 92124
279-9342

Poorman, Forrest & Leroy
15300 Magnolia
Westminister, Cal 92683

Purdy, Ruth & Ben
3658 Euclid Avenue
San Diego, Cal 92105
281-6547

Richart, Mae Dean
4090 Brant Street, #4
San Diego, Cal 92103
298-0132

Robertson, Marilyn & Wally
c/o 1137 Prospect Street
La Jolla, Cal 92037
459-6858

Rosecrans, Jennie L.
1855 Diamond Street, #5-234
San Diego, Cal 92109
270-3595

Roworth, Edwin
1301 Windsor Drive
Cardiff, Cal 92007
753-3903

Ruhl, Deborah Ann
10669 San Diego Mission Rd, #108
San Diego, Cal 92108
284-1083

Sage, Patricia & John
1635 Lanoitan Avenue
National City, Cal 92050
477-3264

Schmeltz, Elaine & Roger
71 Alpine Village Drive
Alpine, Cal 92001
445-5561

Schoening, Bob
Med Lab Tech School
Naval School Health Sciences
San Diego, Cal 92134
233-2715

Schuler, Sherry & Marty
5150 Balboa Arms Dr, #B-3
San Diego, Cal 92117
279-8188

Seay, Eunice & Jim
3290 San Carlos Drive
Spring Valley, Cal 92077
466-8994

Seckington, Sandie
6314 Lake Badin Drive
San Diego, Cal 92119
462-9455

Skoglund, Carol
c/o 3846 E. Highland Avenue
Phoenix, Arizona 85018

Smith, John E.
AIMD Box 24
USS CORAL SEA CV43
FPO, San Francisco, Cal 96601

Smith, Martha & Franklin
872 La Jolla Rancho Road
La Jolla, Cal 92037
459-4920

Smithsonian Institution
Library-Acquisitions
#90105Z0201
Washington, D.C. 20560

Snell, Chuck
P.O. Box AC
Trinidad, Cal 95570

Souder, John W.
7845 Michelle Drive
La Mesa, Cal 92041

Steward, Ellen & Orville
P.O. Box 336
Briarcliff Manor, New Jersey 1051

Stohler, Rudolf
1584 Milvia Street
Berkeley, Cal 94709

Taylor, Kay & Roland
2437 Aster Street
San Diego, Cal 92109
274-2998

Thomas, Louise, Lawrence, David
c/o 590 Embarcadero
Morro Bay, Cal 93442

Thompson, Agnes
716 2nd Street, Space 178
El Cajon, Cal 92020
447-0191

Tisdale, William
4329 Avalon Drive
San Diego, Cal 92103

Upton, Virginia
Box 1614
Sierra Vista, Arizona 85635

Voso, Helen & Ed
1815 Sweetwater Road, Space #134
Spring Valley, Cal 92077
469-8308

Webb, Kay & Ray
Rigdon, Marie
50hA Anita Street, Space 186
Chula Vista, Cal 92011
420-4900

Weber, Gladys
6439 W. Myrtle Avenue, Sp 79
Glendale, Arizona 85301

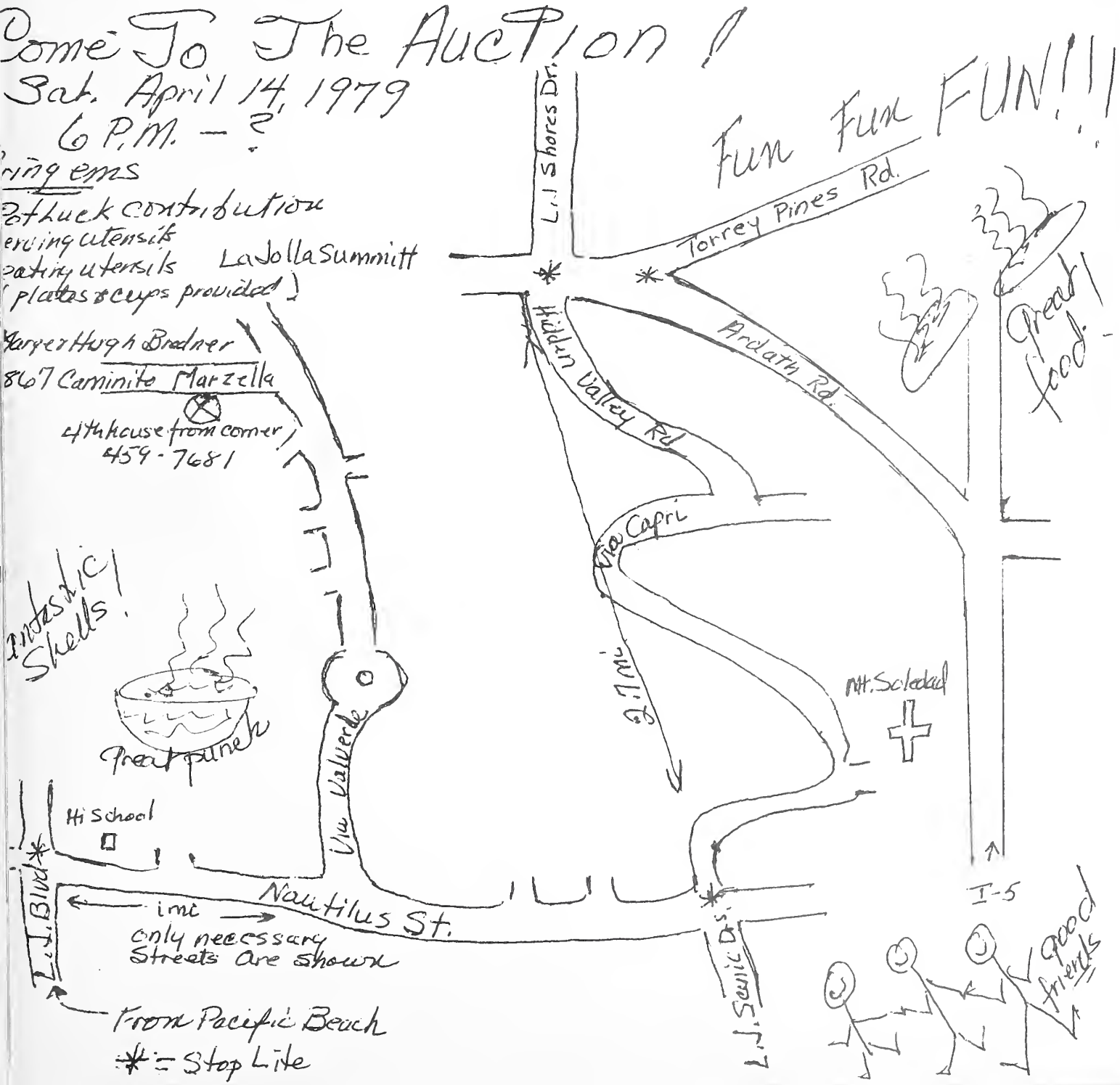
Wright, Jeanne
4905 Twain Ave.
San Diego, Cal. 92120
583-2548

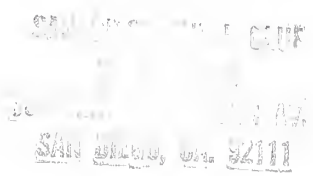
Woolsey, Jody
3717 Bagley Avenue, #206
Los Angeles, Cal 90034

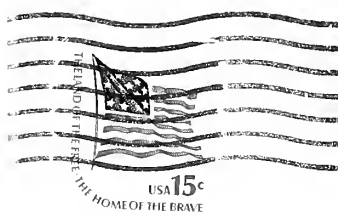
Yeend, Margenette & Arthur
5668 Lord Cecil Street
San Diego, Cal 92122
453-0531

Zuggo, Barbara
P.O. Box 131
West Hatfield, Mass. 01088

Lindebrekke, Lynn & Ken
6306 Lake Badin Ave.
San Diego, Cal 92119
465-1092

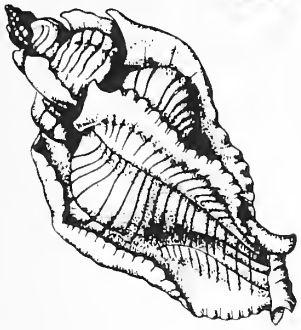






Library - Acquisitions
#79105 2 0201
Smithsonian Institution
Washington, D.C. 20560

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI May 1979 No. 5

PROGRAM: The 1978 AMELA Expedition to the Solomon Islands, Part II. This illustrated talk will be given by Dave Mulliner and Bob Schoening. Part I was given by Phil Faulconer (see FESTIVUS, Nov. 1978, pp. 100-102).

There will be a silent auction of corals and shells.

Date: May 17 Time: 7:30 P.M. Room 104

THE ANNUAL AUCTION/POTLUCK
April 14, 1979

By KAREN HOGAN

With good cheer, excellent food and punch and mountains of beautiful shells to bid upon, it was a fun filled evening for the more than 45 people in attendance. Hugh Bradner, Dave Mulliner and Bob Schoening did an excellent job in auctioning the shells. There were good buys to be had from the abundance of fine shells available.

The Club thanks our gracious hosts, Marge and Hugh Bradner for making their home available to us and to all the others who contributed to make the auction an outstanding success.

MURICIDS FROM OKINAWA AND THE BOHOL STRAITS

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum
Balboa Park, P.O. Box 1390, San Diego, California 92112

A few additional species of Muricidae have come to the attention of collectors recently as a result of the almost steady flow of new molluscan discoveries from the western Pacific. This material is collected from depths of several hundred feet, an area not previously explored with any thoroughness. Although neither identified nor described, illustrations of these species are valuable to encourage exchange of information. If sufficient material of these species are collected and properly analyzed, possibly they may have been published already in some obscure journal. Some of these species are of more than ordinary aesthetic as well as scientific interest, both from the aspect of form and color.

The species figured here are from Okinawa as well as from the Philippines. In the case of Okinawa, the specimens have been obtained by rather deep scuba dives of about 200 feet. The Philippine specimens are from the now well-known area of Bohol Straits in the vicinity of Punta Engano, Mactan Island, where the fishing village is situated.

Fig. 1a

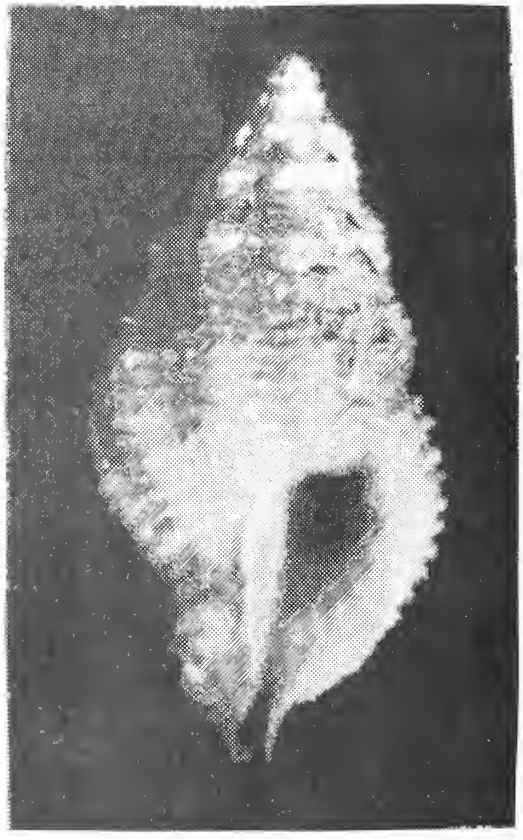


Fig. 1b

The generic affinities of Figs. 1a, b are somewhat difficult to ascertain. The general configuration of the shell suggests a moruloid placement while apertural characters suggest muricopsine characters. Radula studies may be helpful for generic placement in this instance.

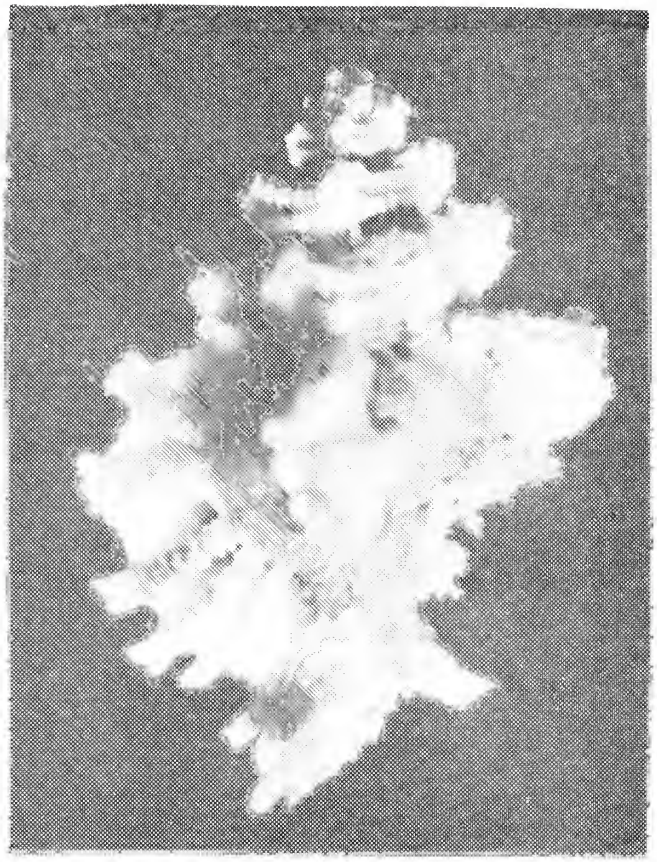


Fig. 2a

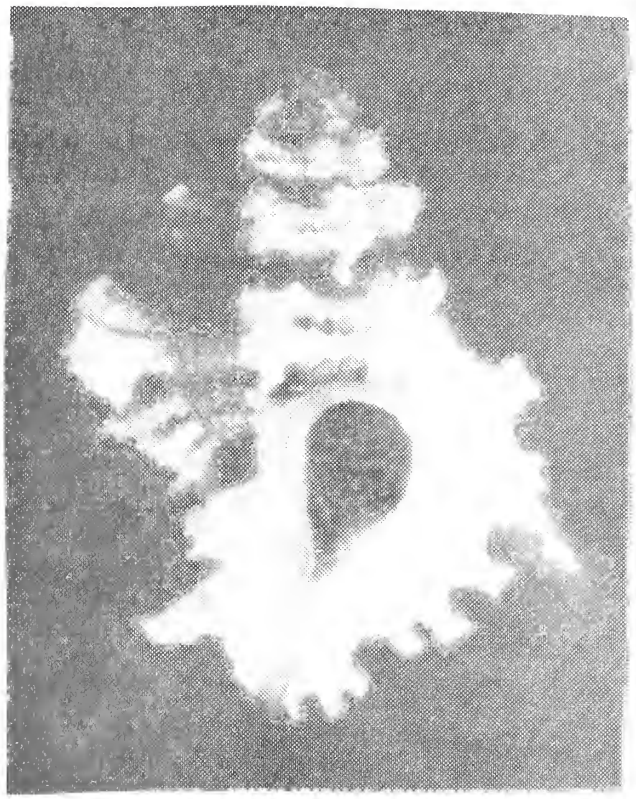


Fig. 2b

The species illustrated by Figs. 2a, b seem assignable to either Murexiella or Favartia. This problem of generic placement applies also to Figs. 3a, b. The Favartia-Murexiella complex of species is turning out to be one of the more numerous in terms of species in the family Muricidae.

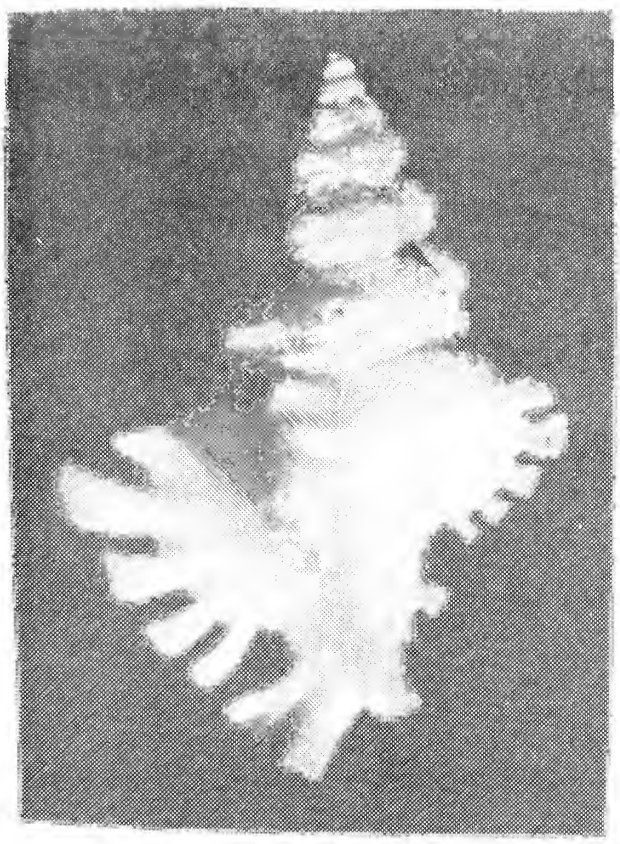


Fig. 3a

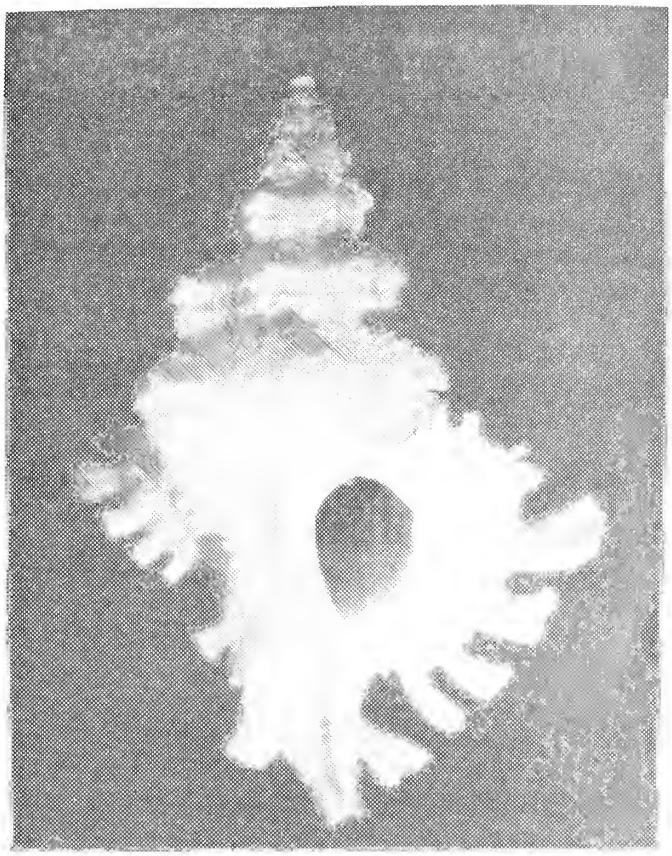


Fig. 3b

Radula differences are not significant between the types of both genera. The occurence of many intermediate forms between the two "genera", differentiated essentially by the length of spines and the development of the connecting web between the spines, suggests a reduction at the generic level to one taxon to cover the entire complex.

I am especially interested in examining further specimens of these species, and would appreciate the opportunity to study such material.

Acknowledgments: The specimens figured here were kindly sent to me for possible identification by Eugenia Wright of Phoenix, Arizona. "Gee" Wright is a keen student and collector of Murex. Dr. Hans Bertsch kindly read this paper. The original slides were taken by Barbara Myers, and David Mulliner made the black and white photographs from the slides.

BOOK REVIEW

BARBARA W. MYERS

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Cone Shells - A Synopsis of the Living Conidae
By Jerry G. Walls
TFH Publications Inc. Ltd. Hong Kong
1011 pp. 1106 color photographs
Price $30.00

This impressive volume was written, as the author states, "for collectors by a collector." It covers 309 species of Conidae, three of which are new species and one a new subspecies. The author has recognized only one genus, Conus.

For each species there is a detailed description. The synonymy is included, referenced and commented on briefly. Variation, comparisons, and distribution are discussed. There is some useful information on shell structure, anatomy, reproduction and the much publicized danger from the venomous barb. A short bibliography is included in addition to the references in the synonymy of each species. Fossil names, and Recent names, with the species the author considers valid in bold type, are listed as well as a compilation of dealers' names.

The color plates are exceptionally well done. Variation within a species is illustrated by using four or more specimens. The black and white text photos are unimpressive.

The Conidae range widely over warm tropical seas. The shell is solid, of a consistent shape, colorful and polished under a drab periostracum. The celebrated Conus gloriamaris Chemnitz, 1777, which has commanded high prices since the 18th century, has drawn attention to the family for years. Their popularity with collectors ranks them with the Cypraeidae and Volutidae.

The nomenclature has become confusing and cumbersome with the increased number of species, and the naming of color forms and varieties. Mr. Walls has evaluated each species, combining forms and changing names in many cases. Whether or not his review of the family becomes controversial remains to be seen, but that it contains a wealth of information very useful to the collector is a fact.

THE NAMING OF A NEW CARIBBEAN VOLUTE
SCAPHELLA CONTOYENSIS EMERSON & OLD, 1979

GENE EVERSON

1660 S.W. 27th Avenue
Ft. Lauderdale, Fla. 33312

In March 1968 Mrs. Christine Goddard of Ft. Myers Beach, Florida found a volute in a bucket of shells which her husband had bought from shrimpers for $2.00. This shell had a checkered spire resembling *Scaphella junonia* but the rest of the shell was completely different. It was very light in weight and had wide spiral bands of color.

Another specimen was dredged five years later by Riley Black, while working the Yucatan Channel of Mexico. This shell was donated to the American Museum of Natural History in New York in 1977. I was able to purchase one of these strange volutes when another was trawled in March 1978. The shrimper had wrapped the shell in cotton and preserved it in a tin can full of alcohol with the animal intact! This was exciting because now, perhaps, this species would be named.

Figure 1a: Dorsal view

Figure 1b: Apertural view

Scaphella contoyensis Emerson & Old, 1979
Length: approx. 180 mm. Width: 70 mm.
Dredged in 73 meters, northwest of Contoy Light, off Yucatan, Mexico, March 1978, Gene Everson collection
Photography by Fred Leonard.

Arranging to meet with Dr. William Emerson, I took my new seashell to New York. The shell was measured and photographed and the animal was removed and given to the museum. Since they already had a specimen for the

holotype, my shell became a paratype and I was able to keep it. Dr. Emerson asked me to verify and obtain information about as many specimens as possible to add validity to the description of the new species. Meanwhile, he and Bill Old would study the animal and research the literature.

The first person that I contacted was Barbara McGinn, whose husband, Tom, is a shrimper out of Cutoff, Louisiana. Riley Black had seen specimens collected by the McGinns. She said that they had found eight specimens and that she would send me color photographs, measurements and locality data. This information arrived and similar documentation was also obtained from Mrs. Goddard.

Next I ventured (literally) to Ernie Ryckman's shell-yard and menagerie in Stock Island, Florida and verified yet another of these unique volutes. It was rumored that Elsie Malone had a specimen with a broken lip, but when she said that it had already been described by the University of Miami, we assumed it to be Scaphella evelina Bayer, which is the only large volute named there. (U. of M. also named a Lyria and two Volutomitra). However, she later unpacked it and sent it to New York where it turned out to be the volute that we were looking for.

Meanwhile, Dr. Emerson was corresponding with Dr. Bayer, who named Scaphella evelina, concerning relationships and differences between the two species, since S. evelina appeared to be the closest relative to this new species. He then acquired three more specimens which the McGinns had sent to Harvard University five years earlier.

Two features of this species emerged during this legwork and research period. One was that the shell color, pattern, and other characteristics were consistent, indicating that this was not just a "freak junonia". The other was that although the reported depths at which this volute was taken ranged from 210 to 540 feet, they all came from the same place. This was the area off the Yucatan known as Contoy--hence the name, Scaphella contoyensis Emerson and Old, 1979.

Ed. Note: The original description of this volute appears in The Nautilus, Vol. 93(1), pp. 10-14, January 10, 1979. This volume is in the Club library.

THE SAN DIEGO SHELL CLUB SCIENCE FAIR AWARD

The Club's participation in The Greater San Diego Science and Engineering Fair is now in its seventh year. Our award is presented to an outstanding upper division entrant in the category of marine life.

This year's committee was Bob Schoening, Don Pisor and Hans Bertsch. As is traditional, the winner may choose one of three books for his or her prize, 1) Barnes, "Invertebrate Zoology," 2) Ricketts & Calvin, "Between Pacific Tides," and 3) Radwin & D'Attilio, "Murex Shells of the World."

This year's winner is Mike D. Moore, an eleventh grader at Torrey Pines High School in Del Mar. In Mike's project, "Byssus Fiber Differences in Response to Wave Shock," he measured the number and strength of byssus fibers in Mytilus edulis in both calm water and in heavy surf conditions. Mike will present his project to the membership and receive his award, Barnes, "Invertebrate Zoology" at the June meeting.

The committee also awarded an Honorable Mention to Amy S. Kimball, a tenth grader at Point Loma High School for her fine work on "The Movement of Acmaea Digitalis." She will receive a commendation from the Club in the mail.

MINUTE SHELLS

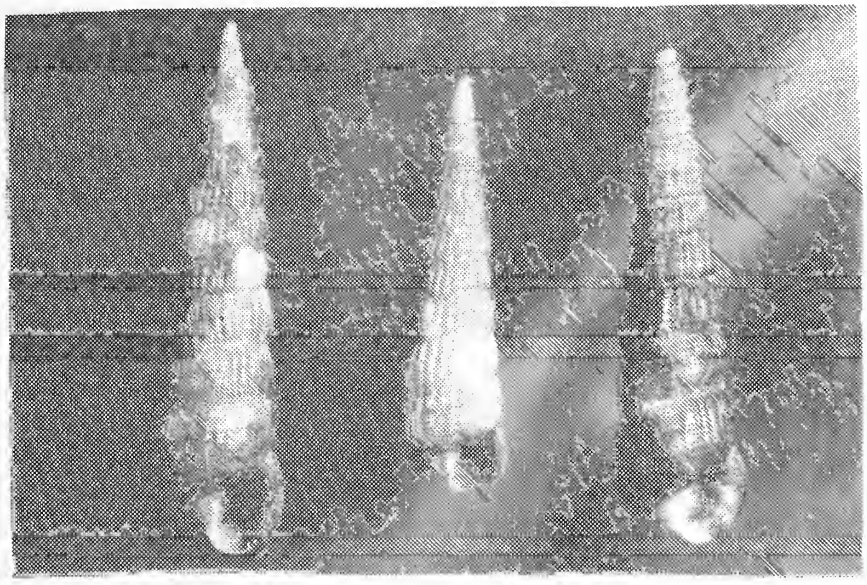
(UPDATE ON *TURBONILLA TRIDENTATA* CARPENTER, 1865)

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

One of the species featured in the "Minute Shells" column of the September 1978 FESTIVUS was *Turbonilla tridentata* Carpenter, 1865. The specimen pictured was from an early collection and had been collected in Newport Bay, Calif. It was relatively small (8.5 mm.) for the species.

In recent months, I have collected a number of larger specimens at Tourmaline Surfing Beach (Pacific Beach), San Diego, Calif. and at Solana Beach, Calif. These have all been dead collected, beach specimens which have apparently washed in from deeper water. In comparing these with shells at the San Diego Natural History Museum, it became obvious that there is a great similarity between *T. tridentata* and *T. catalinensis* Dall & Bartsch, 1909. In fact, Abbott (1974) considers *T. catalinensis* a synonym of *T. tridentata*.



Left: *T. tridentata* Carpenter, 1865; Length: 15.7 mm.

Center: *T. catalinensis* Dall & Bartsch, 1909; Length: 12.4 mm.

Right: *T. tridentata* Carpenter, 1865; Length: 14.8 mm.

Photograph by FESTIVUS staff photographer, Barbara W. Myers

The center specimen, *T. catalinensis* (SDNHM Lot No. 18256), was taken at 35 fms. off Catalina Island, Calif. Original identification was by Dr. Paul Bartsch. The other two specimens are *T. tridentata*; the one on the left taken at Solana Beach, Calif. in the winter of 1978 (Hertz collection), and the one on the right taken by Viola S. Bristol in 1930 at Ocean Beach, Calif. (SDNHM Lot No. 20110).

The *T. tridentata* are chestnut-brown in color, while the *T. catalinensis* are pale amber in color. Although very similar on first examination, I found several distinguishing features on closer examination. These differences were noted by Dall & Bartsch (1909) and are constant for the large number of *T. tridentata* and the half dozen *T. catalinensis* I have examined. The aperture of *T. tridentata* is subquadrate with the posterior angle acute, while in *T. catalinensis* the aperture is rhomboidal with the posterior angle obtuse. In *T. tridentata*, the intercostal spaces (between axial ribs) are traversed by five spiral grooves. These deep spiral lines are often difficult to observe in worn beach specimens. In *T. catalinensis*, the intercostal spaces are marked by nine equally spaced spiral lines. These give

an appearance of heavy spiral ribbing between the axial ribs. My observations lead me to the conclusion that I. catalinensis is a valid species.

Literature Cited

Abbott, R. Tucker. 1974. American Seashells, Second Edition, Van Nostrand Reinhold Co., 663 pages.

Dall, W.H. and Paul Bartsch. 1909. A Monograph of West American Pyramidellid Mollusks. Bull. U.S. Nat. Mus., no. 68, 258 pp. 30 pls. (Dec. 13).

FOR YOUR INFORMATION

1. The joint meeting of the AMU-WSM will be held August 5-10, 1979 at La Quinta Royale Motor Inn in Corpus Christi Texas. Information on field trips, costs for room and registration, as well as sample registration form and 'Call for papers' information have been received by the Club and will be available at the May meeting.

2. The Club will be exchanging publications with Il Naturalista Siciliano, of the Institute of Zoology in Palermo, Italy. This fine publication covers natural history in general with one or more articles per issue on mollusks. It is printed in Italian.

3. Back issues of The FESTIVUS may be purchased for $1.00 per issue while supply lasts. Special issues may be ordered at $2.00 per copy.

4. The FESTIVUS needs your articles.

TOO LATE FOR THE ROSTER

Stowell, Linda & Kit
5102 Towle Street
San Diego, Calif. 92105
282-4726

Leonard, Patricia L.
141 Grandview St. Apt. 27
LeuCadia, Calif. 92024
(714) 753-1190

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

President:.....Hugh Bradner
Vice President:.....Sandie Seckington
Recording Secretary:.....Jacquie Berzins
Corresponding Secretary:...Karen Hogan
Treasurer:.....Walter Robertson
Editor:.....Carole M. Hertz

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI June 1979 No. 6

PROGRAM: Roger Schmeltz will give an illustrated talk on Collecting on Midway Island with a display of shells from the area. Mike Moore, Club Science Fair winner will present his project to the membership. Pictures from the Auction/Potluck will also be shown. Bring in your Olives for display at this meeting(see p. 46).

Date: June 21 Time: 7:30 P.M. Room 104

FROM THE MINUTES: - MAY 12, 1979

KAREN HOGAN, Secretary

The regular meeting was brought to order by Wally Robertson, Treasurer. Members were advised that some still needed to meet their membership dues obligations. Guests were introduced.

The Amela Expedition to the Solomons, Part II was the topic of the presentation by Dave Mulliner and Bob Schoening. Specimens acquired on this fantastic holiday tour were displayed from the collection of Dave and Margaret Mulliner. (Article will appear in a future issue. Ed.).

After the coffee break the silent auction was closed and the business portion of the meeting was held. The treasurer's report indicated that the annual auction was the greatest success ever. A fond farewell to Bob Schoening was given since he is leaving for a tour of duty in Hawaii. The meeting was adjourned at 9:40 P.M.

THE EASTERN PACIFIC CHROMODORIDS
(OPISTHOBRANCHIA: CHROMODORIDINAE)

HANS BERTSCH

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

The family Chromodorididae encompasses 2 subfamilies: the temperate to cold water Cadlininae (with the genus Cadlina Bergh, 1878), and the tropical to warm temperate water Chromodoridinae (with the genera Chromodoris Alder & Hancock, 1855, Chromolaichma Bertsch, 1977, Mexichromis Bertsch, 1977, Thorunna Bergh, 1877, Babaina Odhner, 1968, Casella H. & A. Adams, 1854, and Hypselodoris Stimpson, 1855). There are 15 named species of Chromodoridinae from the western coast of the Americas. The accompanying illustrations, species list, general color descriptions, usual length of living animals, and known distributions can serve as a quick identification guide to these brightly colored nudibranchs. Detailed morphological descriptions, synonymies, bibliography, etc. are given by Bertsch (1977 and 1978) in volumes 20 and 21 of The Veliger.

A. Chromodoris baumanni Bertsch, 1970. White body with numerous red-purple dots; interrupted band of orange around edge of notum. 40-60 mm. Middle Gulf of California to the Galápagos.

B. Chromodoris galexorum Bertsch, 1978. White body; scarlet splotches surrounded by chrome yellow. About 30 mm. Southern two-thirds of the Gulf of California.

C. Chromodoris marislae Bertsch, in Bertsch, Ferreira, Farmer & Hayes, 1973. White body; orange spots and ringlets. To 80 mm. Central and southern Gulf of California.

D. Chromodoris macfarlandi Cockerell, 1901. Body reddish-violet, with three longitudinal dorsal yellow lines. 30-60 mm. Monterey, California, to Bahía Magdalena, Baja California, Mexico.

E. Chromodoris norrisi Farmer, 1963. White body with purple-red and yellow dots. To 60 mm. Gulf of California (a few records from the outer coast of Baja California Sur).

F. Chromodoris sphoni (Marcus, 1971). Cream yellow body with a prominent "red-cross" pattern. 10-20 mm. Mazatlán, Mexico to Panama.

G. Chromolaichma sedna (Marcus & Marcus, 1967). Pure white body color; notum surrounded by vivid red band and an outer marginal brilliant yellow edging. Usually 40-50 mm. Puerto Peñasco, Sonora, Mexico to Panama, and the Galápagos Islands.

H. Chromolaichma dalli (Bergh, 1879). White body and black dots (larger specimens resembling salt-and-pepper); occasional orange or red spots; gills and rhinophores white, light red or orange distally. 20-45 mm. Northern Gulf of California to Costa Rica.

I. Mexichromis antonii (Bertsch, 1976). Coloration consists of shades of blue, magenta, black, yellow-orange and white. 10 mm. Middle Gulf of California to Costa Rica; very few records.

J. Mexichromis porterae (Cockerell, 1901). Deep blue body color; two longitudinal orange-yellow stripes. 10-25 mm. Monterey, California, to just south of Isla Cedros, Baja California, Mexico.

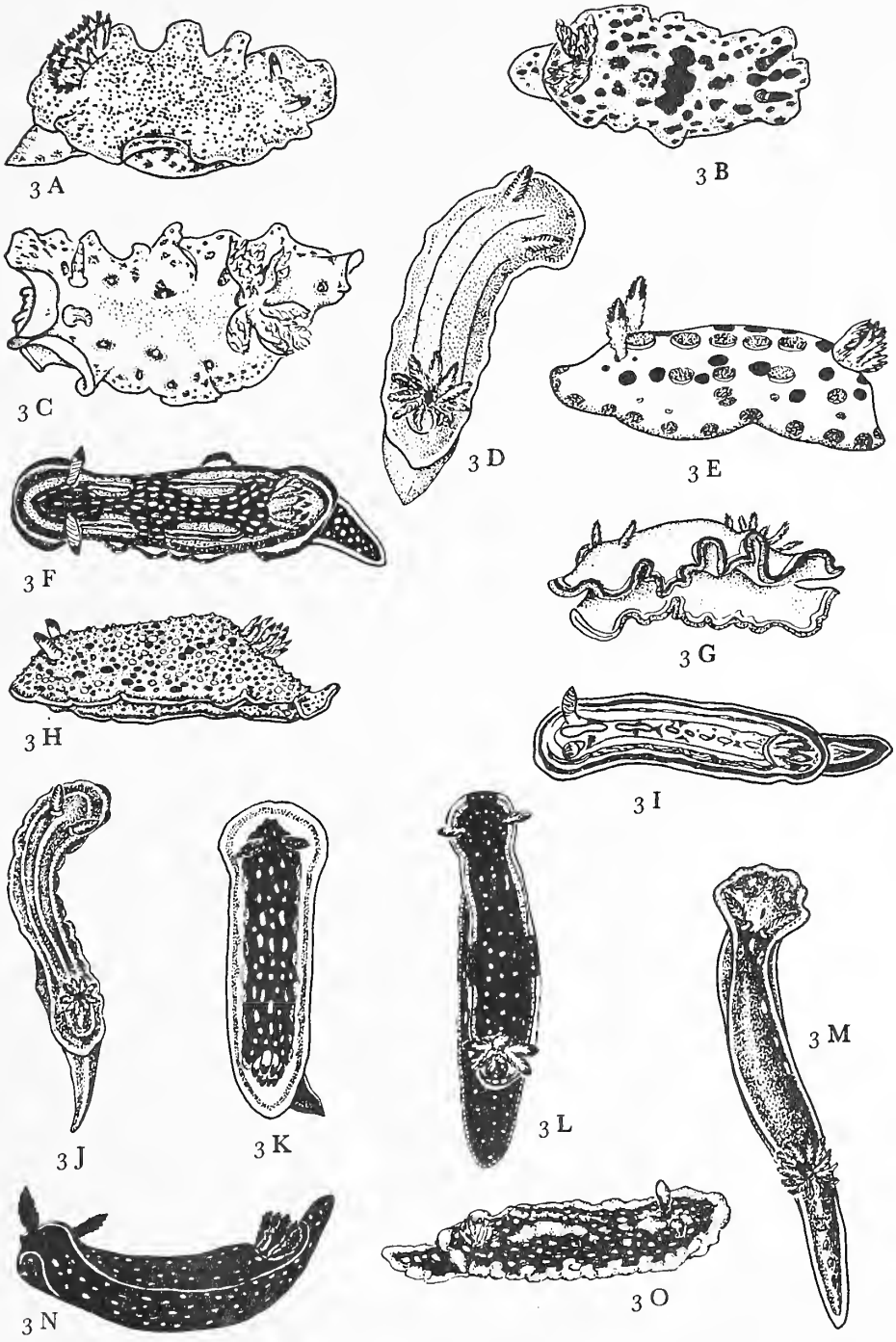


Plate reprinted from Veliger 20(2): 115 (1 October 1977).

K. Mexichromis tura (Marcus & Marcus, 1967). Center of dorsum dark violet to nearly black, with reddish (or yellow) spots and dashes; the broad bluish-white marginal edge contains an orange band. 10-20 mm. La Paz area, Baja California, southern Mexico, and Panama.

L. Hypselodoris agassizii (Bergh, 1894). Body is dark blue; small yellow dots; broken bands of light green, navy blue and yellow surround notum. 20-30 mm. Puerto Peñasco, Sonora, Mexico, to Panama; Galápagos Islands.

M. Hypselodoris californiensis (Bergh, 1879). Body blue, yellow streaks, lightish blue-white marginal band. 50-70 mm. Monterey, California, to Bahía Magdalena, Baja California, Mexico. Rare in Gulf of California.

N. Hypselodoris ghiselini Bertsch, 1978. Body deep navy blue; numerous yellow spots. 30-70 mm. Gulf of California.

O. Hypselodoris lapislazuli (Bertsch & Ferreira, 1974). Shades of blue, yellow dots in the darker colored regions. About 10 mm. Galápagos Islands.

LIBRARY DONATIONS

BARBARA W. MYERS, Librarian

Received from Aivars and Jackie Berzins-

SKIN DIVER for the years 1974-1977, several issues in 1973 and all but May and December of 1978.

SEA for February to December 1977 and several miscellaneous periodicals.

Received from Dr. Hans Bertsch-

The Mollusca of the Chicago Area - Pelecypoda, by Frank Collins Baker. 1898. The Chicago Academy of Sciences, Bull. III, Pt. I, 130 pp. 27 pls.

We express our thanks to the Berzins and Dr. Bertsch for their generosity.

OLIVE DISPLAY AT JUNE MEETING

The volute exhibit at our March meeting drew many favorable comments from the membership and requests that there be more such displays at our meetings. As a result, the Club asks members to bring in their specimens from the Olividae--Oliva, Agaronia, Olivella, Ancilla.

For the August meeting--Cassis and Tonna.

NEW MEMBER

Rev. Jack Wilkins
5635 Lincoln Street
Hollywood, Florida 33021

CHANGE OF ADDRESS

Bob Schoening
EPMU #6
Pearl Harbor, Hawaii 96860

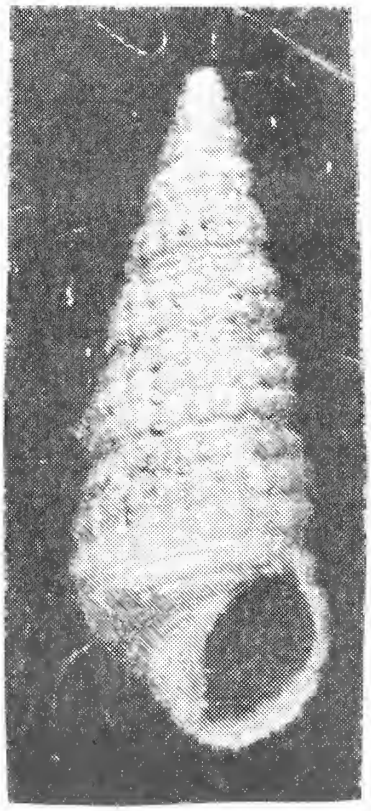
MINUTE SHELLS

BITTIUM MUNITUM AND/OR BITTIUM MUNITUM MUNITOIDE

JULES HERTZ
Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

There are many species of the genus Bittium Gray, 1847 found in the eastern Pacific. The genus Bittium belongs to the family Cerithiidae Fleming, 1822. There is some difference of opinion, however, as to which subfamily it belongs. Keen (1971) puts Bittium in the subfamily Cerithiopsinae H. & A. Adams, 1854, while Abbott (1974) placed it in Bittinae Crossman, 1906.

The specimen pictured below was obtained from an early 1900's collection, and identified as Bittium munitum munitoide Bartsch, 1911. It was collected at San Gerronimo Island, Lower California, Mexico. Abbott considers Bittium munitum munitoide a synonym of B. munitum (Carpenter, 1864). Bartsch (1911) in naming B. munitum munitoide considered it a southern race of B. munitum. The specimens he examined were from San Pedro, California, whereas the type lot of B. munitum was collected by Swan at Neah Bay, Washington. Bartsch distinguished the two by stating that the B. munitum munitoide were smaller and had more ribs (as many as 40) on the last whorl. The specimen pictured here is 6.0 mm. long as compared to the 8.2 mm. specimen pictured by Bartsch. Bartsch also pictured two B. munitum (7.8 mm. and 7 mm.), each smaller than the B. munitum munitoide The specimen pictured here, from Lower California, has less than the 28 axial ribs on the last whorl as reported by Bartsch for B. munitum, which is significantly lower than the number for B. munitum munitoide. Based on the above, I agree with Abbott in his placement of B. munitum munitoide in synonymy.



Bittium munitum
(Carpenter, 1864)

Literature Cited

Abbott, R. Tucker. 1974. American Seashells. Van Nostrand Reinhold, 663 pages.

Bartsch, Paul. 1911. The recent and fossil mollusks of the genus Bittium from the west coast of America. Proceedings of the U.S. National Museum, Vol. 40, No. 1826: 383-414, pls. 51-58 (May 12).

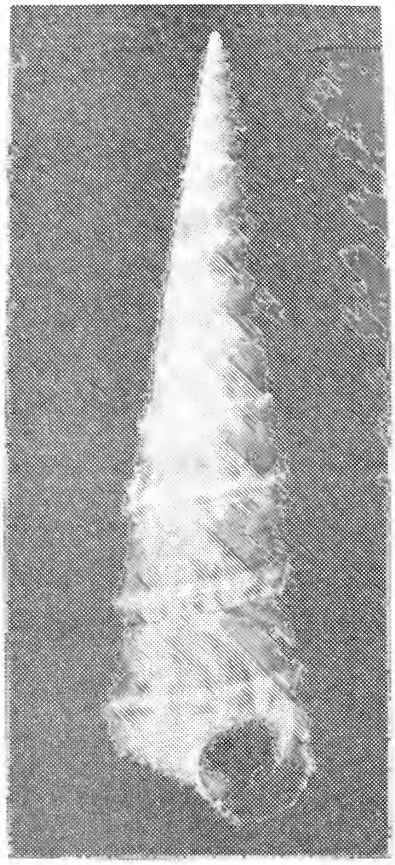
Keen, A. Myra. 1971. Sea Shells of Tropical West America. Stanford Univ. Press. 1064 pages.

OBSERVATIONS ON THE DIFFERENCES BETWEEN THE JUVENILE AND MATURE *TURRITELLA ANACTOR* BERRY, 1957

CAROLE M. HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

The specimens of *Turritella anactor* Berry, 1957, pictured below appear to be two different species. The *T. anactor* shown on the left is easily identified by the characteristic beveled keel just above the suture and the concave outline of the whorls (Keen, 1971). The *T. anactor* juvenile on the right, however, shows none of the identifying features of the adult. The beveled carina on the lower portion of the whorl is lacking and the shell is spirally corded with a protruding spiral ridge or costa central on the whorl instead of the fine spiral striae of the adult.



T. anactor Berry, 1957
Hertz collection
Length: 80.5 mm.

T. anactor
Gemmell collection
Length: 137 mm.

T. anactor
Gemmell collection
Length: approx. 25 mm.

Photographs: Barbara W. Myers, FESTIVUS staff photographer

In *Turritella anactor* the juvenile typically varies greatly from the mature shell. In his original, unfigured description Berry notes the change from the "earliest whorls mesocostate" to "subsequent whorls at first straight-sided, toward strongly constricted mesially and developing a heavy pinched-out secondary carina at the lower quarter, below which the whorl is abruptly beveled into the narrowly channeled suture."

The shell is cream to tan with a flammulose pattern in a medium to purplish brown. The whorls have numerous fine spiral threads above the beveled keel which sometimes appear nodulose as a result of the color pattern. The keel is often slightly noded. The underside of the shell is coarsely threaded with approximately five rows of cords. The thin, chitinous, spirally coiled operculum is typical of the genus.

In the over fifty specimens of T. anactor examined from juvenile to adult, including the two paratypes in the San Diego Natural History Museum, Department of Marine Invertebrates, Type Series 249 collected San Felipe 1957), the protoconch has always been broken.

The specimens figured here were collected from the type locality of San Felipe, Baja California, Mexico. Joyce Gemmell states that T. anactor is no longer common intertidally there. We have found it at extreme low tides in low, muddy depressions where the current flows constantly (Campo Uno, San Felipe) or in natural drainage channels about two feet deep on clay (Pete's Camp & Alicia Playa, San Felipe) always below a -4.0 foot tide level (Gemmell, personal communication). Juvenile specimens have been found in sea star stomachs (DuShane & Brennan, 1969).

Keen (1971) lists the range of this species as San Felipe to Puerto Peñasco. I have not collected this species outside the San Felipe area and the literature search showed only one citation of T. anactor outside of the San Felipe region. Parker (1964:152) dredged T. anactor at about 150 km. south of Puerto Peñasco (29°50'N; 112°49'W) at 73-77 m. deep, on 30 March 1960. He does not indicate number, age, or condition of specimens. Personal communication with Carol Skoglund, who has collected extensively in Puerto Peñasco, verifies the existence of T. anactor in the northeastern part of the Gulf. She says, "I have collected it as a dead shell in Cholla Bay proper and live a little farther around on the Black Mountain side..." Correspondence with Helen DuShane provided the further information that T. anactor "occurs sparingly at Puertecitos. At Choya Bay, Punta Peñasco, I have it, April 1958. At that time I saw a woman come in with a pail full of T. anactor, huge ones..."

The Turritella are filter feeders living on detritus and phytoplankton (Fretter & Graham, 1962 discussing T. communis). Turritella are specialized for their hbbitat, usually living below the surface in mud or sandy gravel where "its position can be detected by two depressions marking the inhalant and exhalant openings to the mantle cavity; the tip of the exhalant opening is often visible. A veil of tentacles around the inhalant opening prevents the ingress of large particles and excessive silt" (Fretter & Graham, 1962).

I wish to thank Carol Skoglund and Helen DuShane for their help in providing locality data for T. anactor, to Joyce Gemmell for her information on habitat and the use of her specimens, to Barbara W. Myers for the excellent photographs, and to Hans Bertsch for his helpful suggestions and for critically reading this paper.

Literature Cited

Berry, S. Stillman. 1957. Notices of New Eastern Pacific Mollusca. -I. Leaflets in Malacology, Vol. 1, No.14:78. (July 19).

DuShane Helen & Ellen Brennan. 1969. A Preliminary Survey of Mollusks from Consag Rock and Adjacent Areas, Gulf of California, Mexico. Veliger. Vol. II(4): 351-363. (April 1).

Fretter, Vera & Alastair Graham. 1962. British Prosobranch Mollusca. Ray Society. 755 pp. (pp. 106-108, 262, fig. 64).

Keen, A. Myra. 1971. Sea Shells of Tropical West America. Stanford Univ. Press. 1064 pp. (pp. 381-394).

Parker, Robert H. 1964. Zoogeography and Ecology Of Some MacroInvertebrates, Particularly Mollusks, In The Gulf Of California And the Continental Slope Off Mexico. Videnskabelige Meddeleserfra Dansk Naturhistorisk Forening, Vol. 126:1-78, pls. X-XV. (p.152).

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE
SAN DIEGO, CA. 92111

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Peyable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI July 1979 No. 7

PROGRAM: Billee Mabry will give an illustrated talk on her Thailand Travels. She will also have a display of the shells she collected there.

Date: July 19 Time: 7:30 P.M. Room 104

FROM THE MINUTES

The June 21st meeting was called to order by Secretary, Karen Hogan. Guests were introduced and the program opened with the presentation of the Club's Science Fair Award to Mike Moore. Dr. Hans Bertsch made the presentation and Mike gave a summary of his project to the membership (see p. 55 this issue). Follwwing this, Roger Schmeltz gave a comprehensive, illustrated talk on Midway Island. His photography of the island and its life was excellent as was the entire presentation. In addition to his informative talk, Roger brought in an extensive display of the shells he had collected there.

Following coffee break there was a very brief business meeting. The meeting was adjourned just before ten o'clock.

TRIPTEROTYPHIS LOWEI FROM THE SOLOMON ISLANDS

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

During June 1978, a few members of the San Diego Shell Club went on a collecting trip to the Solomon Islands. While there, David Mulliner collected a single specimen of a species of Tripterotyphis at thirty feet (Fig. 1). This species is referable to T. lowei Pilsbry, 1931 from the Panamic province (Fig. 2). The specimen from the Solomons also bears a notable resemblance to two other species from Norfolk Island and Queensland.

Fig. 1. Tripterotyphis lowei
Mulliner collection
Size: 11 mm.
Location: 30 ft., diving off
Roncador Reef, Solomon Is.
Date: 6/30/78 - 7/1/78

Fig. 2. Tripterotyphis lowei
SDNHM collection
Coll. Helen DuShane
Size: 11.1 mm
Location: Escondido Bay,
Gulf of California, Mexico
Date: Feb. 5, 1971, intertidal

Ponder (1972) treated these southwestern Pacific forms as subspecies of T. lowei Pilsbry, 1931. The two taxa referred to by Ponder are T. lowei norfolkensis (Fleming, 1961) and T. lowei colemani (Ponder, 1972). However, Ponder regarded them as conspecific although he retained the subspecific names. The distribution of T. lowei in the Panamic extends to the Galapagos Islands where the species attains a larger and more robust appearance (Fig. 3).

Fig. 3. Tripterotyphis lowei
Mulliner collection
Size: 18 mm.
Location: Sullivan Bay, Bartholome Is., Galapagos Is. in 3-10 ft. March 1971

Fig. 4. T. robustus (Verco, 1895)
SDNHM collection
Size: 12 mm.
Location: South Australia

In addition to the above, other Recent species of Tripterotyphis are:

T. fayae (Keen & Campbell, 1964), eastern Pacific.
T. robustus (Verco, 1895), South Australia, Fig. 4.
T. triangularis (A. Adams, 1856), Caribbean Islands.

Except for T. triangularis and T. fayae, the remaining Recent Tripterotyphis are closely allied if not conspecific with T. lowei.

In Tripterotyphis Pilsbry & Lowe, 1932, the tubes are confluent with the varices as in the type species, T. lowei Pilsbry, 1931. In Pterotyphis Jousseaume, 1880, the tubes immediately precede the varices as in the type species, P. pinnatus (Broderip, 1833).

Two fossil species are listed in the literature: T. wenzelidesi (Hörnes, 1856) from the Miocene of Europe and T. vokesae (Gertman, 1969) from the lower Miocene of Florida.

The sizes of the specimens shown in Figs. 1-4 are compared in Figs. 5 and 6.

Fig. 5. Apertural views L to R.
T. lowei Solomon Islands
T. lowei Galapagos Islands
T. robustus South Australia
T. lowei Panamic, (Escondido Bay, Gulf of California)

Fig. 6.
Doraal views of above

References

Adams, A. 1856. Descriptions of 2 new genera and several new species of Mollusca, from the collection of Hugh Cuming, Esq. Zool. Soc. London Proc. pp. 119-124. (December).

Fleming, C.A. 1962. The genus Pterynotus Swainson (Gastropoda, Family Muricidae) in New Zealand and Norfolk Island. Trans. of the Royal Soc. of N.Z. 88(4) [Vol. 2, No. 14] :109-119, pl. 1.

Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the Western Atlantic region. Tulane Studies in Geology and Paleontology. 7(4):143-191. pls. 1-8, text figs. 1-3.

Hörnes, M. 1856. Die Fossilen Mollusken des Tertiar-Beckens von Wien. K.K. Geol. Reichsanstalt Abh 3(1-10); 1-736. pls. 1-52.

Keen, A. Myra & Bruce G. Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1): 46-57, pls. 8-11, 3 text figs.

Pilsbry,H. A. 1931. Typhis lowei n. sp. Nautilus 45(2): 72.

Ponder, Winston F. 1972. Notes on some Australian genera and species of the family Muricidae. Jour. Mal. Soc. Aust. 2(3): 215-265, pls. 20-25.

Acknowledgments

Mr. David K. Mulliner kindly cooperated in the preparation of this paper by providing specimens and photographs. Dr. Hans Bertsch read the paper and his comments are acknowledged.

MINUTE SHELLS

BITTIUM QUADRIFILATUM CARPENTER, 1864

JULES HERTZ

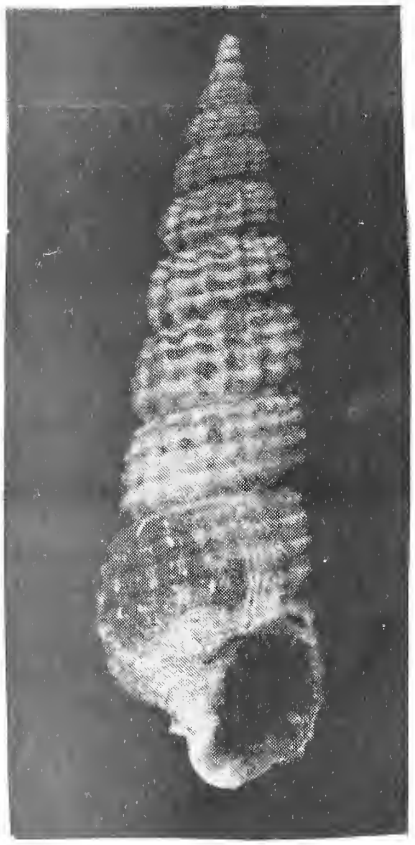
Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

For the next few months, this column will continue to feature species of Bittium from the eastern Pacific. The descriptive features of the genus Bittium were described by Tryon in the Manual of Conchology as follows: Shell elevated, with numerous granular whorls and irregular varices; anterior canal short, not recurved; inner lip simple, outer lip not reflected, usually with an exterior rib. Operculum four-whorled with central nucleus.

The most common species found in San Diego is Bittium quadrifilatum Carpenter, 1864. The specimen pictured here is one of eleven taken by Carole M. Hertz on May 25, 1969 in the Flood Control Channel, San Diego, California. The specimens were live collected in black silt under cobwe -like algae in 3 to 6 feet of water. The reported range for this species is Monterey, California to San Ignacio, Lower California.

The shell was identified using the description and figure in Bartsch (1911). The shell is elongate-conic and a dull chestnut brown. Bishop & Bishop (1973) report Bittium quadrifilatum abundant in sand in the Flood Control Channel in 1971.

The photograph of B. quadrifilatum is by David K. Mulliner, FESTIVUS staff photographer.



Bittium quadrifilatum
Carpenter, 1864
Length: 12mm Width: 3.6mm

Literature Cited

Bartsch, Paul. 1911. The Recent and fossil mollusks of the genus Bittium from the west coast of America. Proc. U.S. Nat. Mus. Vol. 40. No. 1826 pp. 383-414, pls. 51-58 (May 12).

Bishop, M.J. and S.J. Bishop. 1973. A census of marine prosobranch gastropods at San Diego, California. The Veliger. Vol. 16(2): 143-152. (Oct. 1).

Tryon, G.W., Jr. 1879-1913. Manual of Conchology. Philadelphia, ser.1, vols. 1-17.

The following is a project outline written for The FESTIVUS by Mike Moore, The San Diego Shell Club's 1979 Science Fair winner. Mike, an 11th grader, ably presented a summary of his project at the June meeting and chose Barnes' "Invertebrate Zoology" as his Club award.

BYSSUS FIBER DIFFERENCES IN RESPONSE TO WAVE SHOCK

MIKE MOORE

This study was conducted to determine the manner in which Mytilus edulis was adapting to redically different surf conditions. In his paper, "The Effect of Wave Impact on Some Aspects of the Biology of Sea Mussels," Dr. Harger noted that more force was needed to pull a M. edulis off a rock in exposed shoreline than to pull the same species off a rock in sheltered bay waters. However, he did not qualify whether or not M. edulis was producing more and/or stronger byssus fibers. Byssus fibers are the means by which mussels attach themselves to a substrate. The byssus fibers are secreted by the byssus gland (at the base of the foot) and are hardened by a chemical reaction with salt water.

In an attempt to determine the nature of the differences in force needed to remove M. edulis, I designed two experiments. The first was a combined density study and count of the number of M. edulis per 30 cm x 30 cm sample and the number of fibers per animal. Samples were taken from the Ingraham St. bridge (Mission Bay) and Tabletops Tidepool (Solana Beach). My second experiment was a tensile strength test to determine the breaking strength of individual fibers. Mussels were collected from the same locations as described above. Results were calculated from the raw data obtained from the testing apparatus. This consisted of a lab-stand to which one of the ends of the fiber was attached; the other end clipped to a small container into which water was pipetted.

It can safely be concluded thet Mytilus edulis does respond directly to wave shock because:

1. Surf mussels produced 56% more fibers than bay mussels.
2. Surf mussel fibers are 28% stronger than bay mussels.
3. Colony strategy differs--surf mussels form very dense closely packed colonies to control sway (260 mussels over 2 cm in length per 30 cm square). Bay mussels form very loose colonies to allow movement to escape rising silt (94 mussels over 2 cm in length per 30 cm square).

CHANGES OF ADDRESS

Ames, Cliff
Highway 112-5
Eagle Rock, Star Route
Cassville, Mo. 65625

Leonard, Patricia L.
1073 Aloha Drive
Encinitas, Calif. 92024
436-7372

Rosecrans, Jennie
4600 Lamont St. #4-308
San Diego, Calif. 92109

NEW MEMBERS

Bamford, Wayne & Janet
4250 Mt. Henry Avenue
San Diego, Calif. 92117
277-8320

THE MISIDENTIFIED BUCCINUM CHARTIUM

BARBARA W. MYERS AND HANS BERTSCH

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

The holotype specimen of Buccinum chartium Dall, 1919 (United States National Museum catalogue number 226270), was dredged off Honshu Island, Japan, in 260 fathoms. Dall did not illustrate this species in his original description. Dall (1925) figured a specimen bearing the USNM catalogue number 224198. The photograph was labelled as an illustration of B. chartium and the original B. chartium locality data were repeated. Oldroyd (1927: plt. 22, fig. 2) reproduced the same figure, again calling it B. chartium. These illustrations prove not to be Buccinum chartium.

Sadao Kosuge (1975) illustrated the holotype (USNM 226270) of B. chartium. Our inspection of the actual holotype (Figs. 1 and 2) confirms Dall's original description and Kosuge's correct figuring of B. chartium. The two specimens (the holotype illustrated here USNM 226270 and Dall's figure of USNM 224198) are two different species.

Fig. 1. Buccinum chartium Dall, 1919
Holotype USNM 226270
apertural view.

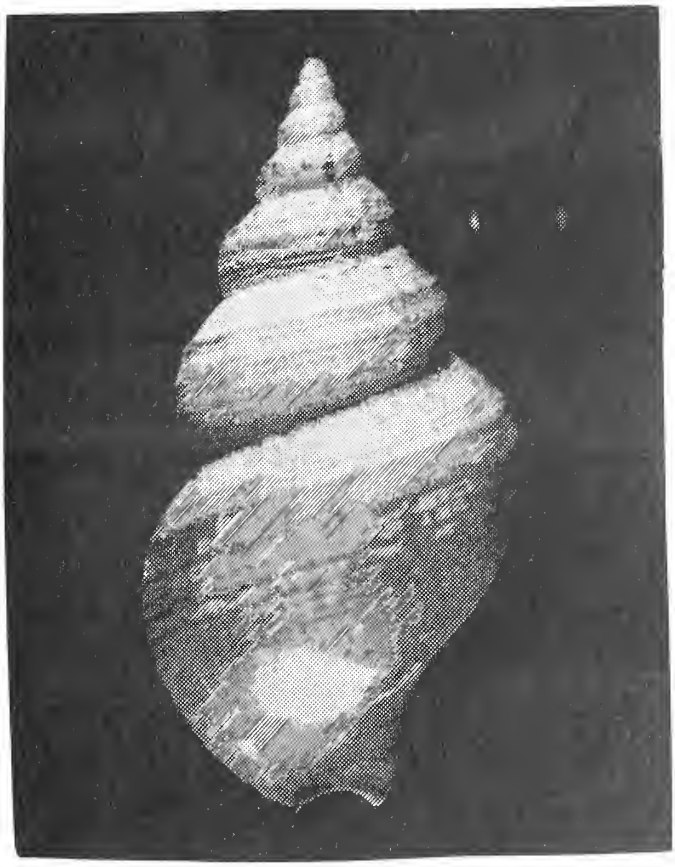


Fig. 2. Buccinum chartium Dall, 1919
Holotype USNM 226270
dorsal view.

Dr. Rosewater (in litt.) informed us that the specimen figured in Dall (1925: pl. 6, fig. 2) has been lost. This specimen had been

collected in the Bering Sea, off the Pribiloff Islands in 688 fathoms (not from off Honshu Island, Japan). The specimen illustrated by Dall carried the wrong name for years. We suspect that this specimen (USNM 224198) may actually be the recently described Brevisphonia circumreta Lus, 1973. Additional data on this fasciolarid are given in Bertsch and Myers (in press).

We thank Dr. Joseph Rosewater, Curator, Department of Invertebrates, United States National Museum, for his courtesy.

LITERATURE CITED

Bertsch, H. and B. Myers. in press. Abyssal Specimens of Spinula calcar and Brevisphonia circumreta (Bivalvia and Gastropoda) from the Eastern Pacific. Jap. Jour. Malac. (Venus).

Dall, W.H. 1919. Descriptions of new species of mollusca from the north Pacific Ocean in the collection of the United States National Museum. Proc. U.S. Nat. Mus. 56(2295): 293-371.

Dall, W.H. 1925. Illustrations of unfigured types of shells in the collection of the United States National Museum. Proc. U.S. Nat. Mus. 66(2554): 1-41; 36 plts.

Kosuge, S.. 1975. Illustrations of type specimens of Molluscs described by William Healey Dall (North Western Pacific gastropods). 29 plts.

Lus, V. Ya. 1973. Novaya Fastsiolariida iz nizhney abissali severnoy chasti Tikhogo okeana. Akad. Nauk SSSR Trudi Inst. Okeanologii 91: 203-212; 3 plts.

Oldroyd, I.S. 1927. The marine shells of the west coast of North America. Vol. II, part I. 297 pp. 29 plts. Stanford University Press, California.

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc. Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI August 1979 No. 8

PROGRAM: Dr. Hans Bertsch, who has recently returned from a month of opisthobranch research in Hawaii, will give an illustrated talk on Hawaiian Nudibranchs.

Amy Kimball, the Club's second place Science Fair Award winner, will explain her project to the membership.

Bring in your Cassis and Tonna for display at this meeting.

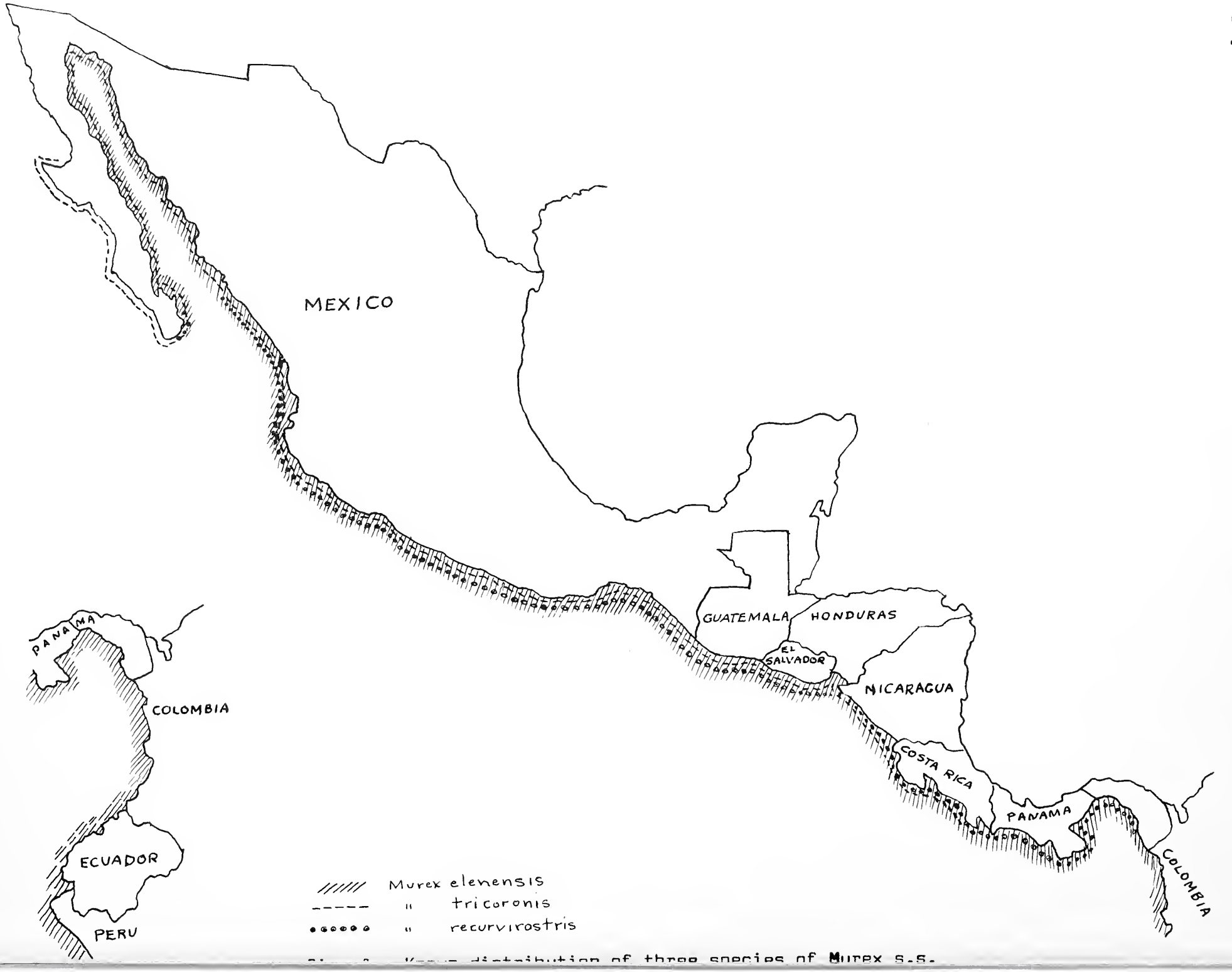
SAVE THE DATE!! The annual September party will be held on Saturday, September 22nd at the Voso's home. The party will have an Italian theme. Map and details of the party will appear in the September issue of The FESTIVUS.

FROM THE MINUTES OF THE JULY MEETING

KAREN HOGAN, Secretary

The meeting was brought to order at 7:45 by President Hugh Bradner. The speaker for the evening, Billee Mabry, once again had us looking for our traveling shoes with her presentation on her recent Thailand trip. Sights of the exotic countryside were shown along with prized shells like Conus bengalensis.

During the brief business meeting it was announced that Crawford Cate's, "A Review of the Triviidae (Mollusca: Gastropoda)" Memoir No. 10 is available in the San Diego Natural History Museum. The Club library will purchase this as well as Alison Kay's "Hawaiian Marine Shells: Reef and Shore Fauna of Hawaii. The meeting was adjourned at 9:30 p.m.



distribution of three species of Murex S.S.

THE EASTERN PACIFIC SPECIES OF MUREX SENSU STRICTO

ANTHONY D'ATTILIO & CAROLE M. HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

It is the purpose of this paper to clarify both the identity and distribution of the 3 species of Murex s.s. found in the eastern Pacific. As the species are here understood, only one occurs over the entire zoogeographic province. The remaining two species have a more restricted range. The known ranges are indicated on the map, fig. A.

The collections examined for this study were principally those of the San Diego Natural History Museum (SDNHM) and the Los Angeles County Museum of Natural History (LACM). In addition, information was sought from various private collections.

Systematics of Murex s.s., eastern Pacific
Family: Muricidae
Subfamily: Muricinae
Genus: Murex

Synonymy and Range:

Murex elenensis Dall, 1909 (=M. plicatus Sowerby, 1834 not M. plicatus Gmelin, 1791). Range: Gulf of California, south to Peru.

Murex recurvirostris Broderip, 1833 (= M. nigrescens Sowerby, 1841). Range: Gulf of California from Mazatlan and La Paz south to Panama. No documented evidence was found for the occurrence of this species south of Panama in the collections examined.

Murex tricoronis Berry, 1960 (= M. funiculatus Reeve, 1845, not M. funiculatus DeFrance, 1827). Range: Cedros Islands and southward on the outer coast of Baja California, Gulf of California and south along the mainland to Costa Rica.

Discussion: M. elenensis Dall, 1909, fig. 1. This species has a strongly formed shell. The rugged characters are present both in the axial and spiral elements; the shell possesses 2 to 3 intervarical costae; the spines are strong and thick, those on the body shorter than those on the canal where they number 3 to 5, and are of impressive length. The receding side of each varix is moderately depressed. Color is of considerable value; the shell has an underlying flesh color over which are found 3 brown to purplish brown bands which are distributed on the body whorl, the central one indistinct except from within the aperture. There are 6 weakly colored primary cords on the body, yellow in color and decidedly lighter than the dark spiral bands. Frequently the aperture is tinged with lavender. Approximate maximum length is 90 mm. Distribution from Punta Peñasco, Sonora, Mexico at the

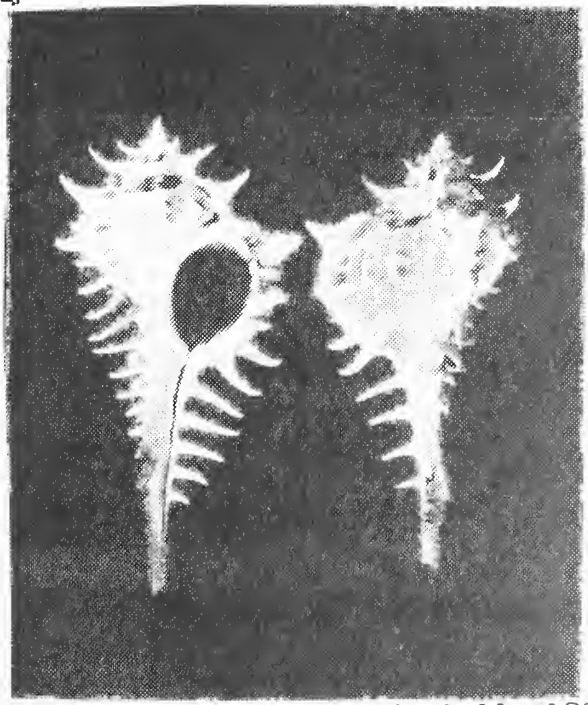


fig. 1. Murex elenensis Dall, 1909
SDNHM Collection No. 23141

upper Gulf of California to Peru (Dall, 1909). Within the Gulf, it is of common occurrence intertidally and is dredged by commercial fishing vessels in moderate depths. There is no reliable evidence that this species occurs on the western coast of Baja California.

Murex tricoronis Berry, 1960. fig.2. This species reaches a length of approximately 70 mm. It may be distinguished from M. elenensis by the following characters; the shell is lighter, less rugged in overall appearance; the axial costae are reduced most often to two, the spines are weaker and shorter, more sharply pointed and sometimes reduced to mere points numbering 3 to 4 on the body; on the canal the spines are usually very short or reduced to points. Coloring is generally pale flesh with, at times, an overall flush of rust color; the 3 pale brown bands are barely discernible and the color of the body extends over the spiral sculpture. At the periphery the cords are distinctly colored with a reddish line. When the brown bands are strong enough to show well, the shoulder band on the dorsal side is intensified to a dark brown blotch. The receding side of the varices is weakly or not at all depressed. Specimens from Scammons Lagoon have, at times, a more inflated body whorl and poorly developed spines but as a whole the species shows little variation over its range

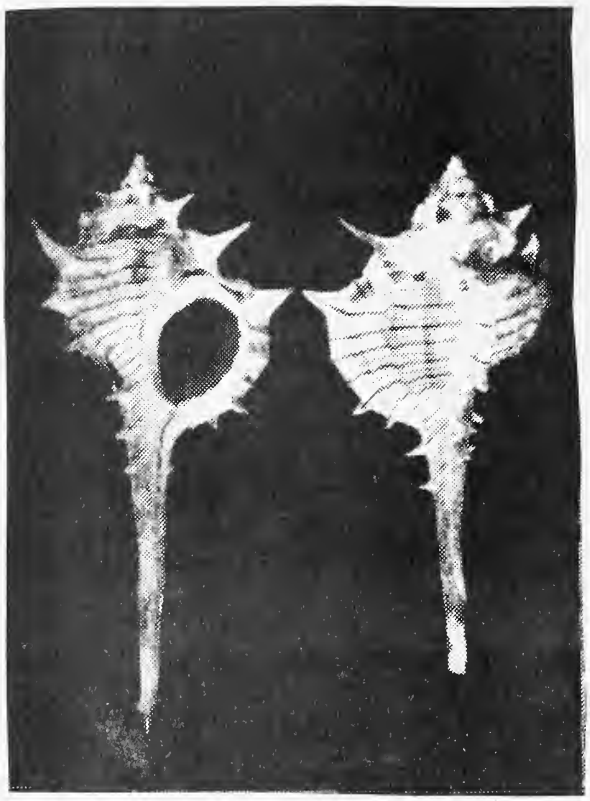


fig. 2. Murex tricoronis Berry, 1960
SDNHM Collection No. 45807

Murex recurvirostris Broderip, 1833. fig. 3. There is little documented evidence that this species enters the Gulf of California beyond Mazatlan and La Paz, Mexico. In the LACM there are a few specimens collected at Topolobampo Bay within the Gulf by Dr. McLean. These specimens are poorly developed and we assign them to M. recurvirostris with some question due to their lack of clear cut characters. The species attains an approximate maximum length of 50 mm. and is the smallest and probably least abundant of the three species in the Panamic province. The shell is the most darkly colored, tending towards brown. There are 3 darker brown bands on the body, the periphery of the spiral cords are faintly colored

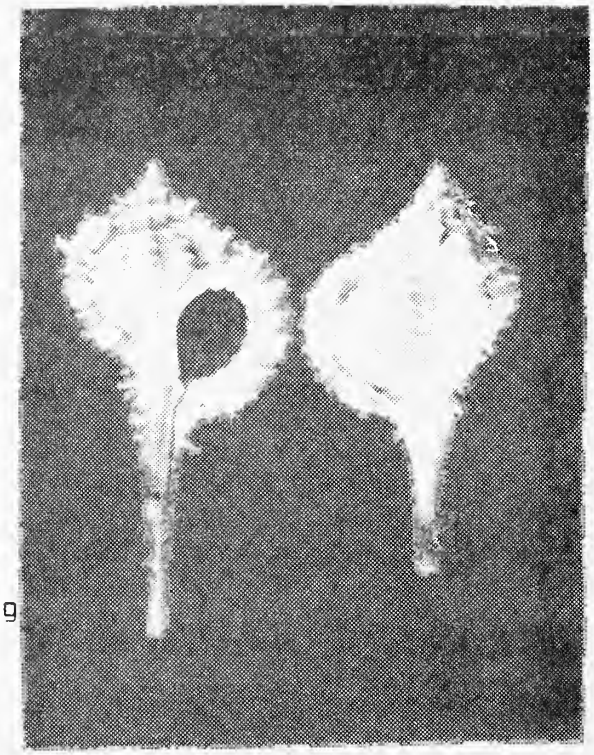
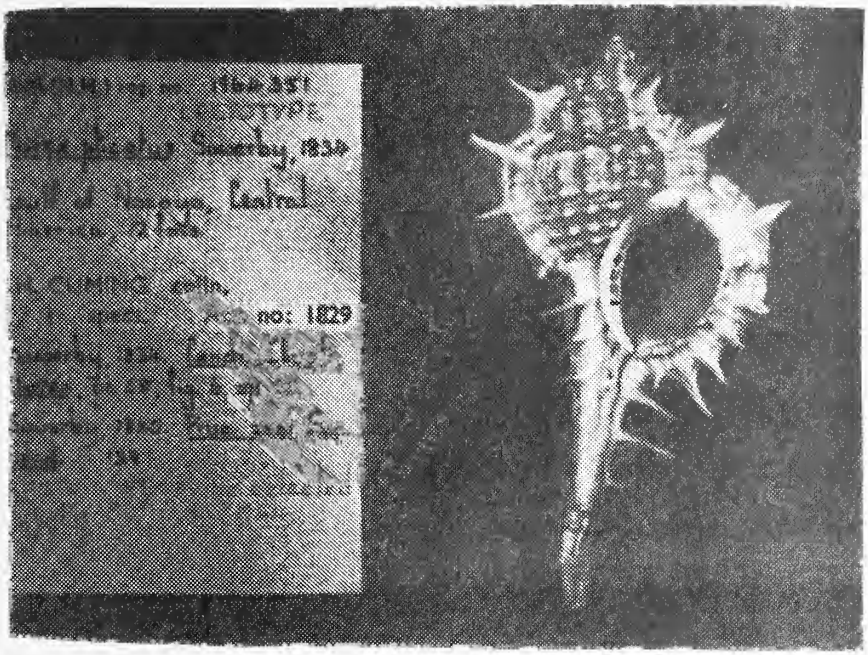


fig. 3. Murex recurvirostris Broderip, 1833.
SDNHM Collection No. 51685

rust and the cords are lighter in color than the surrounding surface. All the spines are much reduced, more often appearing as spurs, a prominent one at the shoulder and one on the posterior portion of the canal. The receding side of each varix is more deeply excavated than in the other two species. Within the outer lip there are well developed denticles, and weak lirae are found on the columella anteriorly.



Figures 4, 5 and 6 refer to specimens in the British Museum (Natural History). Types were not selected by the original authors. Apparently, according to the information on the labels of figs. 4 & 5, Axel Olsson was to have selected lectotypes. We have no information that this selection has been published.

fig. 4. Murex plicatus Sowerby, 1834

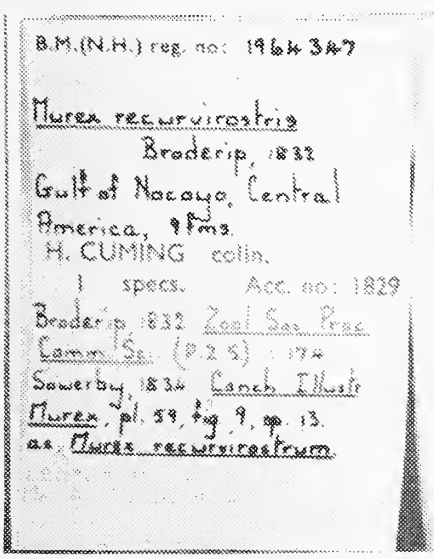


fig. 5, Murex recurvirostris Broderip, 1832

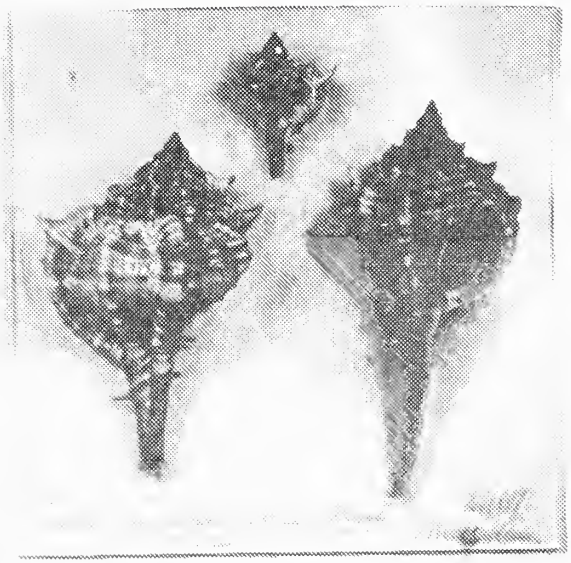


fig. 6. Murex recurvirostris Broderip.

Much collecting has been done throughout the Panamic province. However, the more southerly portions of Mexico, Guatemala, Nicaragua and Costa Rica are much less well known malacologically. The same may be said for the coasts of Colombia and Ecuador. Distributional patterns will, no doubt, need revision as these areas are more extensively studied.

Literature Citations

As the fauna has been extensively covered by Keen, A. Myra. 1971. Sea Shells of Tropical West America, Second Eition. 1064 pp. (pp. 512-516, figs. 975-978), the reader is referred to that work for the very numerous citations of works dealing with this province.

Acknowledgements

We are indebted to the following for various reasons and for much of the data used: Dr. James McLean, LACM; Joyce Gemmell, Jules Hertz, and Barbara W. Myers, associates at the SDNHM; Margaret Mulliner of San Diego, Bill and Rita Scheck of San Diego; and Carol Skoglund of Phoenix, Arizona. Barbara W. Myers kindly did the photography. The photographs of the originals of the British Museum specimens were furnished by Dr. Emily H. Vokes of Tulane University, New Orleans, La.

MINUTE SHELLS

BITTIUM LARUM BARTSCH, 1911

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

The Bittium featured this month is again from the eastern Pacific. It was named and figured by Bartsch (1911). The specimen of Bittium larum Bartsch, 1911 shown in Figure 1 was obtained from a lot collected in the early 1900's off Catalina Island, California. The species is elongate-conic in shape and light brown in color. Bartsch described the post-nuclear whorls as appressed at the summit and decidedly overhanging. The early post-nuclear whorls have four equal and equally spaced spiral cords. Later whorls have intercalated spiral cords between all the primary cords. The whorls are marked by axial ribs. The intersection of these and the cords form elongate tubercles. The long axes of the tubercles coincide with the spiral sculpture, and the spaces between spirals appear as broad, strongly incised lines on the later whorls.

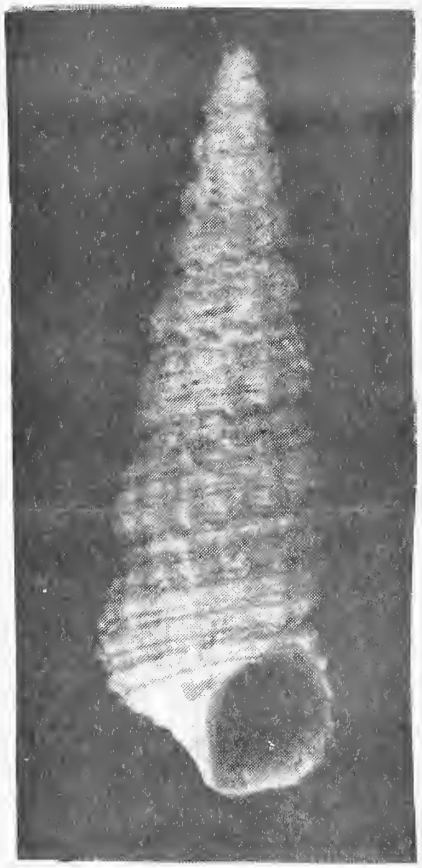


Figure 1. Bittium larum Bartsch, 191
Length: 11 mm; Width: 3.5 mm

Literature Cited

Bartsch, Paul. 1911. The Recent and fossil mollusks of the genus Bittium from the west coast of America. Proc. U.S. Nat. Mus., Vol. 40 (1826):383-414, pls. 51-58. (May 12).

Correction: The MINUTE SHELLS column of The FESTIVUS, May 1979 incorrectly reported the locality data for the figured Turbonilla tridentata specimens. The specimen on the left was from a lot collected many years ago by H.N. Lowe at Mission Beach, San Diego (SDNHM #18250). The specimen on the right was collected intertidally as a beach specimen at Tourmaline Canyon, Pacific Beach, San Diego on Sept. 2, 1978. The locality data for the center specimen, Turbonilla catalinensis, was correctly reported.

AN HISTORICAL REVIEW OF THE SYSTEMATICS OF ORBITESTELLA DIEGENSIS (BARTSCH, 1907)

BARBARA W. MYERS

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

Urbitestella diegensis (Bartsch, 1907) is a minute (maximum size 1.0 mm), disc-shaped gastropod named for its type locality, San Diego, California. The intricate sculpture, which can only be seen under a microscope, is detailed in the drawing by Anthony D'Attilio. (Fig. 1).

Bartsch originally placed this species in the genus Cyclostrema Marryatt, 1818, and the family Vitrinellidae. McLean (1969) changed the genus to Vitrinorbis Pilsbry and Olsson, 1952. Recently McLean (1978) reassigned this species to Orbitestella Iredale, 1917, and to the family Orbitestellidae.

A review of the literature reveals contradictions in the placement of these genera and families within the Orders Archeogastropoda and Mesogastropoda.

In Table 1, we see that according to Dall, Thiele, Wenz and Moore the genus Cyclostrema is in the Order Archeogastropoda. However, the family Vitrinellidae is almost unanimously assigned to the Mesogastropoda. The exception is Dall whose superfamily is in the Archeogastropoda. Changing this species (diegensis) to the genus Vitrinorbis in the family Vitrinellidae seemed to establish it as a Mesogastropod.

Table 2, shows the genus Orbitestella and the family Orbitestellidae assigned to both the Archeogastropoda and the Mesogastropoda. Thus by changing this species (diegensis) to the genus Orbitestella and the family Orbitestellidae, its status as a Mesogastropod is again controversial.

No additional clarification of the problem has resulted from the recent systematic treatment of Golikov and Starobogatov (1975).

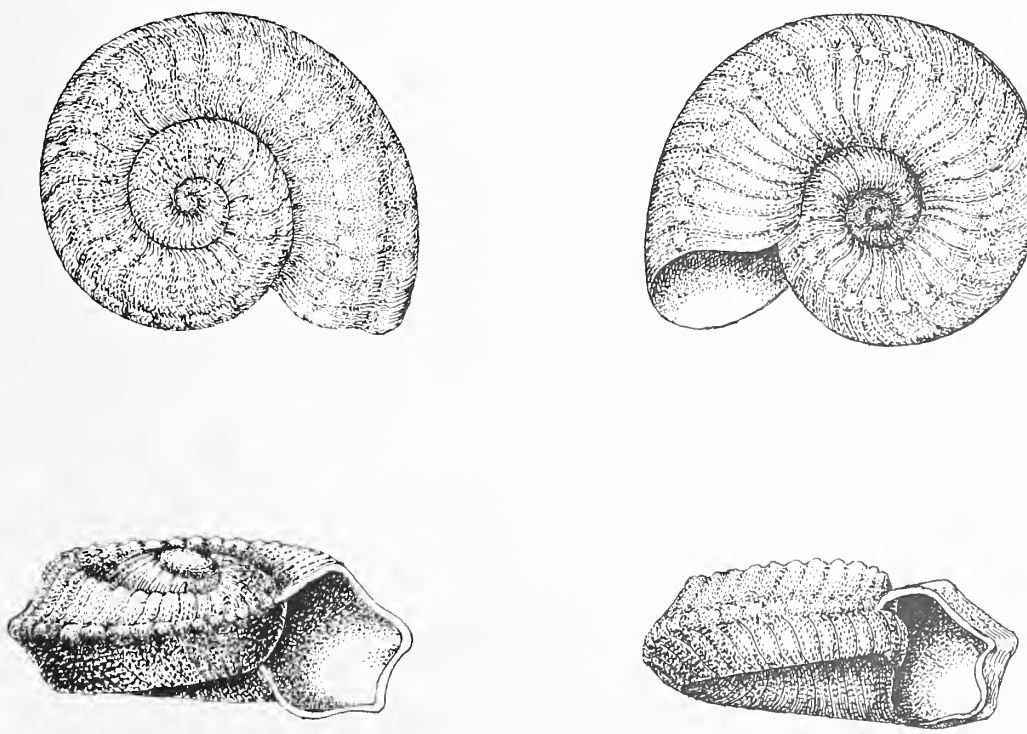


Fig. 1. Orbitestella diegensis (Bartsch, 1907). SDNMH Catalog #73868. Drawing by Anthony D'Attilio. 50X. Published with permission of San Diego Society of Natural History (Environment Southwest). Specimen collected by J.D. Myers, June 1979, 65 ft off Pt. Loma, Ca.

TABLE 1: Classification of the families Cyclostrematidae and Vitrinellidae within the Orders Archeogastropoda and Mesogastropoda.

REFERENCE	ORDER	SUPERFAMILY	FAMILY	GENUS	SPECIES
Bartsch, 1907	n.s.	n.s.	Vitrinellidae	Cyclostrema	diegensis
Dall, 1921	n.s.	Rhipidoglossa	Vitrinellidae	Cyclostrema	diegensis
Thiele, 1929	Archeogastropoda	Trochacea	Cyclostrematidae	Cyclostrema	n.s.
Thiele, 1929	Mesogastropoda	Rissoacea	Adeorbidae (Vitrinellidae)	n.s.	n.s.
Wenz, 1938	Archeogastropoda	Trochacea	Cyclostrematidae	Cyclostrema	n.s.
Wenz, 1938	Mesogastropoda	Rissoacea	Tornidae (Vitrinellidae)	n.s.	n.s.
Moore, 1960	Archeogastropoda	Trochacea	Cyclostrematidae	Cyclostrema	n.s.
Taylor and Sohl, 1962	Mesogastropoda	Rissoacea	Vitrinellidae	n.s.	n.s.
McLean, 1969	Mesogastropoda	n.s.	Vitrinellidae	Vitrinorbis	diegensis

TABLE 2: Classification of the family Orbitestellidae and the genus Orbitestella within the Orders Archeogastropoda and Mesogastropoda.

REFERENCE	ORDER	SUPERFAMILY	FAMILY	GENUS	SPECIES
Thiele, 1929	Mesogastropoda	Rissoacea	Homalogyridae	Orbitestella	n.s.
Wenz, 1938	Mesogastropoda	Rissoacea	Omalogyridae	Orbitestella	n.s.
Moore, 1960	Archeogastropoda	Trochacea	Orbitestellidae	Orbitestella	n.s.
Taylor and Sohl, 1962	Archeogastropoda	Trochacea	Orbitestellidae	n.s.	n.s.
McLean, 1978	Mesogastropoda	n.s.	Orbitestellidae	Orbitestella	diegensis

(n.s. = not stated)

ACKNOWLEDGEMENTS

My sincere thanks to Anthony D'Attilio for allowing me to use his drawings and for his stimulating discussions regarding the literature; Dr. Hans Bertsch for his helpful suggestions and critical review of the manuscript; and my husband, J. D. Myers, for collecting the specimen of Orbitestella diegensis (Bartsch, 1907).

LITERATURE CITED

Bartsch, Paul. 1907. New mollusks of the family Vitrinellidae from the west coast of America. Proc. U.S. Nat. Mus. 32(1520): 167-176. 11 figs.

Bertsch, H. 1979. The Mission Bay worm and the San Diego scallop. Environment Southwest #486: 16-19. 6 figs. (Summer).

Dall, W. H. 1921. Summary of marine shellbearing mollusks of the northwest coast of America... Bull. U.S. Nat. Mus. 112. 217 pp. 22 pls.

Golikov, A.N. and Starobogatov, Y. I. 1975. Systematics of Prosobranch Gastropods. Malacologia 15(1): 185-232. 5 figs.

Iredale, T. 1917. Mollusca Name Changes. Proc. Malac. Soc. 12: 327-328.

McLean, J. H. 1969. Marine shells of southern California. Los Angeles County Mus. Nat. Hist. Science Ser. 24, Zoology #11: 104 pp. 54 figs.

McLean, J. H. 1978. Marine shells of southern California. Los Angeles County Mus. Nat. Hist. Science Ser. 24, Revised Edition. 104 pp. 54 figs.

Moore, R. C. 1960. Treatise on Invertebrate Paleontology. Part 1. Mollusca. (J. Brookes, Knight et. al.) 351 pp. 216 figs. (Mollusca, General features; Scaphopoda, Amphineura, Monoplacophora, Archeogastropoda).

Pilsbry, H. and Olsson, A. 1952. Vitrinellidae and similar gastropods of the Panamic Province. Pt. II. Acad. Nat. Sci. Philadelphia. 104: 35-88, pls. 2-13.

Taylor, D. W. and Sohl, N.F. 1962. An outline of gastropod classification. Malacologia 1(1): 7-32, 1 fig.

Thiele, J. 1929. Handbuch der Systematischen Weichtierkunde. Jena: Gustav Fisher. Bd. 1, Teil 1: 376 pp. 470 figs.

Wenz, W. 1938-44. Gastropoda Allgemeiner Teil and Prosobranchia. In O. H. Schindewolf ed. Handbuch der Paloozoologie. 948 pp.

FOOD PREFERENCES OF SCORPAENICHTHYS MARMORATUS

DAVID J. MYERS

3761 Mt. Augustus Ave., San Diego, Ca. 92111

As a summer mini project, I have been examining the stomach contents of the fish I catch while scuba diving at the Pt. Loma kelp beds. On at least five separate occasions, I have been able to examine Scorpaenichthys marmoratus (cabezon), Pimelometopon pulchrum (sheephead) and Paralabrax clathratus (kelp bass). The stomachs of both the kelp bass and sheephead contained the usual and expected small fish. From the cabezon, a member of the family Cottidae, I have removed Pugettia producta (Randall, 1839), Paraxanthias taylori (Stimpson, 1860), Cancer sp., Octopus sp., Norrisia norrisi (Sowerby, 1838), Haliotis sp. (foot only) and a 1½ in. Haliotis assimilis Dall, 1878, with the shell intact and attached. Cabezon, considered a gourmet food, is himself a gourmet, feasting on the best at hand in his environment.

COLLECTING IN SANTA CRUZ, CALIFORNIA (*TURCICA CAFFEA*, *ASTRAEA GIBBEROSA*, *OCENEBRA INORNATA*)

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

On December 14, 1978, Carole and I were able to collect one afternoon in Santa Cruz, California. We collected at low tide at Santa Cruz Point in ankle deep water among large rocks covered with long strands of slippery kelp. In less than an hour, we collected two species intertidally that are only found in deep water off San Diego.

The first, a fully mature and live *Turcica caffea* Gabb, 1865 was found in the mid-tide zone, several feet above the water on a large algae-covered boulder. Bishop and Bishop (1973) in their census of marine prosobranch gastropods at San Diego only report this species from off shore. I have found dead specimens of *T. caffea* in the Flood Control Channel, San Diego apparently washed in from deeper water. Although not common, this species has been previously reported intertidally washed in on kelp (Abbott, 1974).

The second unusual find for us was *Astraea gibberosa* (Dillwyn, 1817). Although this specimen was juvenile (approx. 1-in. diameter by 1-in. high), it was live collected. Again, Bishop and Bishop(1973) only record this species from deep water in the San Diego area.

The most interesting find was a juvenile *Ocenebra* which we had never before collected. It is pictured in Figs. 1a and 1b. Since we were collecting in a new area, I searched several days before stumbling on the

Fig. 1a. Apertural view

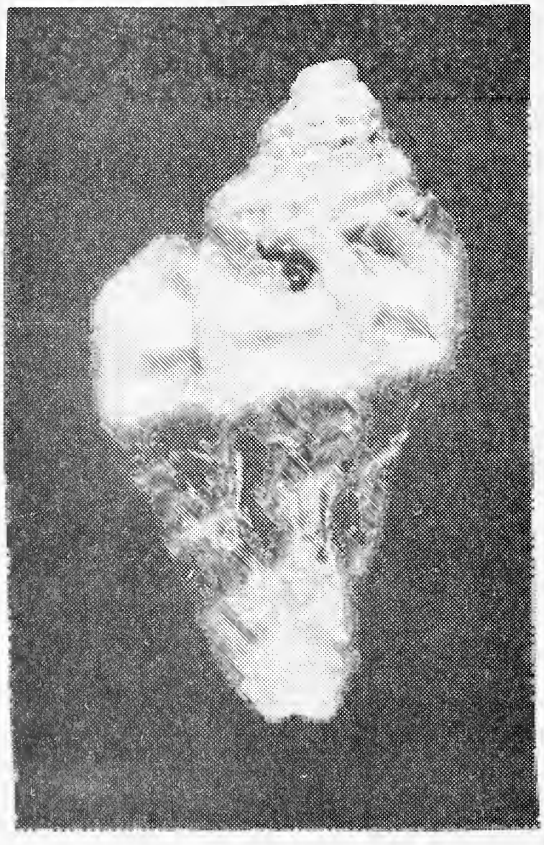


Fig. 1b. Dorsal view

Ocenebra inornata (Recluz, 1851)
Juvenile specimen; length: 9.7mm, width: 5.5mm

identity. After identifying the juvenile, I found to my surprise that we had a pair of adult specimens in our own collection. The species is identified as Ocenebra inornata (Récluz, 1851) and a synonym, Ocenebra japonica Dunker, 1860, has been used extensively in the past.

Figures 2a and 2b below show an adult Ocenebra inornata collected in February 1971 by Col. George Hanselman in an oyster bed in Olympia, Washington. The similarities of juvenile and adult specimens of O. inornata are readily apparent once they are compared side by side. The most tell-tale feature is the rectangular pattern formed by the spiral sculpture of uneven low cords intersecting axial varices or axial riblike swellings. This species was introduced from Japan prior to 1929.

Photographs were taken by David K. Mulliner, FESTIVUS staff photographer.

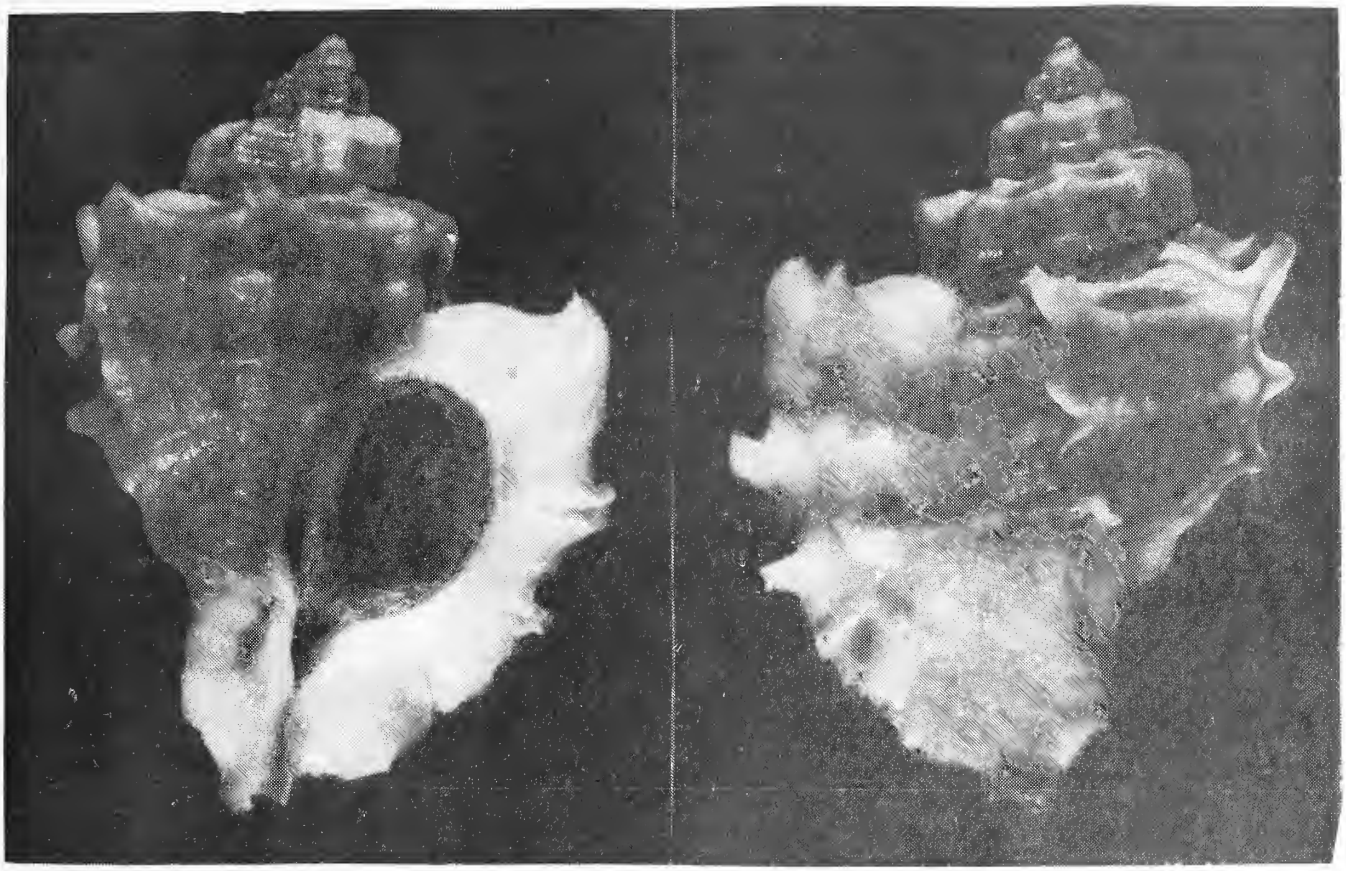


Fig. 2a Apertural view Fig. 2b. Dorsal view
Ocenebra inornata (Récluz, 1851)
Adult specimen; length: 38mm, width: 29mm

Literature Cited

Abbott, R. Tucker. 1974. American Seashells, Second Edition. Van Nostrand Reinhold Co. 663 pp. (p. 52).

Bishop, M.J. and S.J. Bishop. 1973. A census of marine prosobranch gastropods of San Diego, California. The Veliger. Vol. 16(2):143-152. (Oct. 1).

SAN DIEGO SHELL CLUB
% G. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

DIEGO, CA
AUG 9
P M
1979

RETURN POSTAGE GUARANTEED

Smithsonian Institution
Library - Acquisitions
Washington, D.C. 20560

THIRD CLASS MAIL

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI September 1979 No. 9

COME TO THE FESTA!!! Our annual September party will have an Italian theme and will be held on Saturday evening, September 22, 1979 at the home of Helen and Ed Voso. The party begins at 6:00 P.M. See map on last page of this issue for details and directions.

FROM THE MINUTES OF THE AUGUST 16 MEETING

SHERRY D. SCHULER

The meeting was brought to order at 7:45 P.M. by Treasurer Walter Robertson because President Hugh Bradner was in Russia. The first speaker of the evening was Amy Kimball. Amy won a Club award in the Greater San Diego Science Fair and she spoke to the membership about her project on the homing instinct in limpets. Dr. Hans Bertsch presented her with the book, "COMMON INTERTIDAL INVERTEBRATES OF SOUTHERN CALIFORNIA" by Richard K. Allen. as the Club's award to her. Our main speaker for the evening was Hans Bertsch who gave a very interesting presentation on the different types of life that are found underwater in Hawaii. He talked especially about the nudibranchs that are found there and the research that he has been doing on them. His photography was beautiful.

During the brief business meeting Carole Hertz announced that The FESTIVUS needs articles.

Help is needed with the September party. The signup sheet for the party was passed around for the dishes to be served at the party.

Rose D'Attilio and Margenette Yeend were thanked for the refreshments and the meeting was adjourned at 9:30 P.M.

MINUTE SHELLS

BITTIUM ESCHRICHTII AND BITTIUM ESCHRICHTII MONTEREYENSE

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92111

A common species of Bittium from the eastern Pacific is Bittium eschrichtii (Middendorff, 1849). This species was first described and named by Gould (1849) as Cerithium filosum. However, the name was preoccupied, having been used for another species by Philippi (1849). Middendorff named it Turritella eschrichtii in the same year and described it in Latin and German. Carpenter (1864) first recognized this species as a Bittium. In his treatment of the genus Bittium from the west coast of America, Bartsch (1911) described and figured a specimen of B. eschrichtii (Cat. No. 122558, U.S.N.M.). The range of Recent B. eschrichtii is from Sitka, Alaska to Cape Foulweather, Oregon. Fossil specimens have been taken from Fossil Rock, Coos Bay, Oregon; upper Wildcat formation, Humboldt County; Merced-Purisima south of San Francisco; lower and upper San Pedro series at Deadman Island and San Pedro; Crawfish George's, Los Angeles County; and Santa Barbara. Copies of the Middendorff and Bartsch descriptions are reprinted in Oldroyd (1927). Fossil records are detailed in Grant and Gale (1931).

Bartsch described the shell he figured as "broadly elongate-conic, varying in color from white to chestnut brown. The nucleus consists of a single, smooth, white whorl, well rounded. Post-nuclear whorls well rounded, marked by four strong, somewhat flattened spiral keels between the sutures, which are separated by deep, strong, spiral grooves about two-thirds as wide as the keels. In addition to this spiral sculpture, the whorls are marked by numerous fine spiral striations and fine lines of growth. Periphery of the last whorl marked by a sulcus as wide as the sulci between the keels on the spire."

Bartsch (1907) named a southern race Bittium eschrichtii montereyense and in 1911 he repeated the description and figured a specimen. He reported specimens from Crescent City, California to Cape St. Lucas, Lower California and fossil specimens from Deadman Island, California (Lower San Pedro series). The southern race differs from the typical form according to Bartsch by "being less strongly spirally keeled, much more smooth, more slender, and in every way more elegant." In Bittium eschrichtii montereyense the variegated forms predominate. The specimen figured here was collected by the Hertz family intertidally at Cayucos, California on December 21, 1969 at a -1.0 foot tide. The photograph of the shell appears at a 10x magnification and was taken by David K. Mulliner, FESTIVUS staff

B. eschrichtii montereyense
Bartsch, 1907
Length: 10.0 mm, Width: 3.6 mm

Table 1. SPECIMENS EXAMINED

BITTIUM ESCHRICHTII

SDNHM Lot No.	Locality	Donor or Collector	Number of Specimens	Size Range, mm.
19637	Alaska	--	10	12-17
38719	Davidson Point, Annette Is., Alaska	E.C. Allison (1945)	8	12-15
5375	Orcas Is. Puget Sound, Washington (10-30 fms.)	F. Baker	34	8-17
40702A	Olga, Washington	A.M. Strong	6	8-19
5376	Cape Foulweather, Oregon	C.R. Orcutt	2	12-13
BITTIUM ESCHRICHTII MONTEREYENSE				
5378	Crescent City, California	E.P. Chace	9	10-13
5379	Pacific Grove, California	E.M. Chaney	16	4-13
5377	Monterey, California	H. Hemphill	18	4-14
19636	Monterey, California	H.N. Lowe (1918)	19	9-14
5381	Cayucos, California	A.M. Strong	6	8-10
40702	Cayucos, California	A.M. Strong	11	4-11
5380	Cayucos, California	M.E. Caruthers	6	11-16

photographer. A comparison of B. eschrichtii and B. eschrichtii montereyense was pictured by Bartsch (1911).

The question of the validity of the subspecies invariably arises and would require study of large quantities of specimens covering the full range from Baja California to Sitka, Alaska. All of the specimen lots in the San Diego Natural History Museum (SDNHM) have been reviewed and details are summarized in Table 1. In examining these shells as well as a few in my own collection, I find the same general differences that Bartsch noted when he named the "southern race" B. eschrichtii montereyense. However, within the various lots of B. eschrichtii, I found slender and "elegant" specimens. Likewise, in the lots of B. eschrichtii montereyense I found some relatively broad specimens. Therefore, the slenderness ratio (length/width) is not a positive identification feature. The specimens from the north (B. eschrichtii) were on the average larger, coarser in sculpture, had rounder spiral keels, and broader spacing between keels. Again, these distinctions were not always consistent. The shells from Davidson Point, Annette Island, Alaska were more slender and had smoother spiral keels, so that they approached in appearance the "southern race."

The final decision on the validity of the subspecies is dependent on the active searching of the southern coast of Oregon. This would determine if there is any geographical isolation. In addition, field collecting is warranted along the full coast from Baja California to Alaska to determine if there is a correlation of shell features with local conditions, such as wave action, water temperature, and substrate. My feeling at this time is that B. eschrichtii montereyense is invalid.

Literature Cited

Bartsch, P. 1907. Proc. U.S.N.M., Vol. 33: 178. (Oct. 23).

Bartsch, P. 1911. Proc. U.S.N.M., Vol. 40: 387-389. pl 58, fig. 4&5, (May 12).

Carpenter, P. P. 1864. Rep. Brit. Assoc. Adv. Sci. for 1863. p. 655.

Gould, A. A. 1849. Proc. Boston Soc. N. H., Vol. 3: 120 (May).

Grant, U.S. IV & H.R. Gale. 1931. Catalogue of the marine Pliocene and Pleistocene Mollusca of California. Vol. 1: 761. pl. 24, fig. 9. (Nov. 3).

Middendorff, A. Th.von. 1849. Beitrage zi einer Malacologia Rossica. Vol. 2: 68. pl. 11, fig. 1. (August).

Oldroyd, I.S. 1927. The marine shells of the West Coast of North America. Vol. 2 (3): 18-19. pl. 79, fig. 4&5. (June 15).

Philippi, R.A. 1849. Zeitschr. f. Malakozool. for 1848. p. 143. (March).

ANNOUNCEMENT

It has been a year since Anthony D'Attilio published his valuable, "MURICACEA; CATALOGUE OF THE FAMILY CORALLIOPHILIDAE." The October issue of The FESTIVUS will feature his Additions and Corrections to this Catalogue.

SOLEMYIDAE: CLARIFICATION OF TWO SPECIES IN THE SUBGENUS PETRASMA

JOYCE GEMMELL, BARBARA W. MYERS, CAROLE M. HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Bivalvia
Solemyidae H. & A. Adams
Solemya (*Petrasma*) *panamensis* Dall, 1908
Solemya (*Petrasma*) *valvulus* Carpenter, 1864

Introduction:

The Solemyidae are primitive bivalves of the lowest order of the bivalvia called Protobranchia. Though consisting of few species, they have a wide geographical range, being found off both our American coasts, West Africa, the Mediterranean, Australia and New Zealand. Several species occur intertidally or the shallow subtidal, but most are dredged from deep water. Much confusion exists concerning both the morphology and life habits of members of this family.

The Solemyidae differ from most other bivalves in that the longest portion of the shell is the anterior end (from the beaks forward) rather than the posterior end. The cylindrical shell is flexible and consists mainly of a varnish-like, amber to brown periostracum which extends beyond the margins of the fragile calcareous valves. The periostracum has ribs radiating from the beaks and extending to the ventral margin. (Fig. 1). The thick and thin portions of the ribbing allow greater flexibility and pleating of the periostracum as it is folded into the mantle chamber. (Fig. 2). This ability to fold the periostracum into the mantle chamber is necessary to compress and forcibly eject water through the posterior opening propelling the mollusk through the water in a series of darts that remind one of a squid. Drew (1900) described this method of swimming for *Solemya velum* Say, 1822. Owen (1961) observed *S. parkinsoni* Smith, 1874, swimming in this manner.

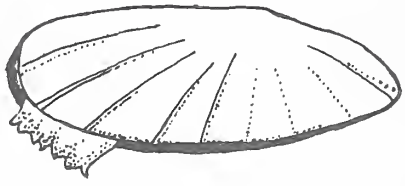


Fig. 1.

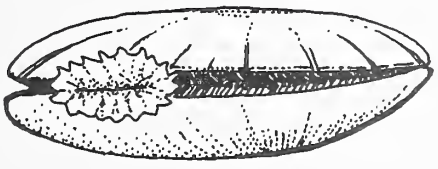


Fig. 2.

The foot in the Solemyidae is long and tubular and adapted to digging. The very tip of the foot is cleft and can flatten out to form a disk which acts as an anchor in its burrow. (Fig. 3). Although Morse (1913) contended *S. velum* Say, 1822 burrowed

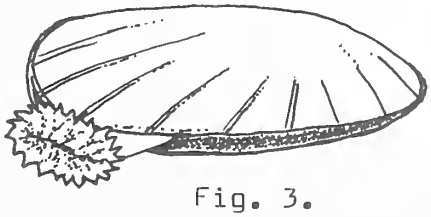


Fig. 3.

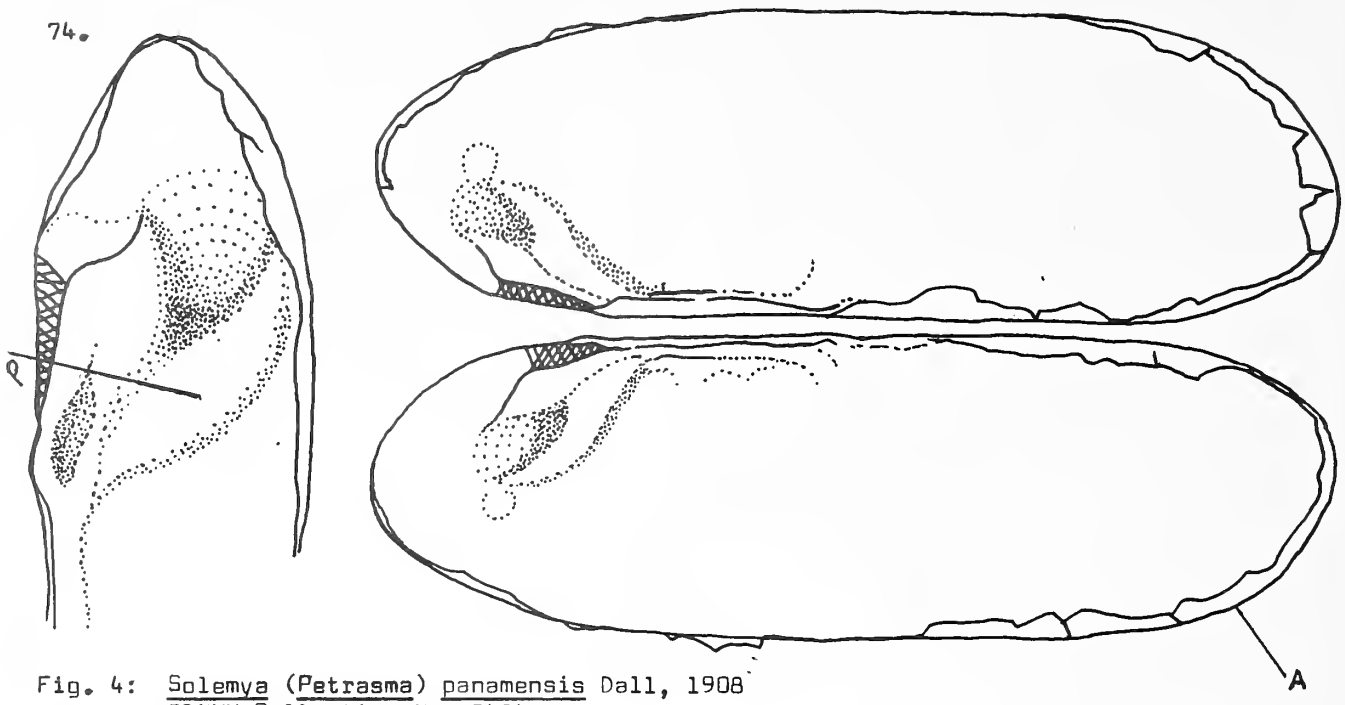
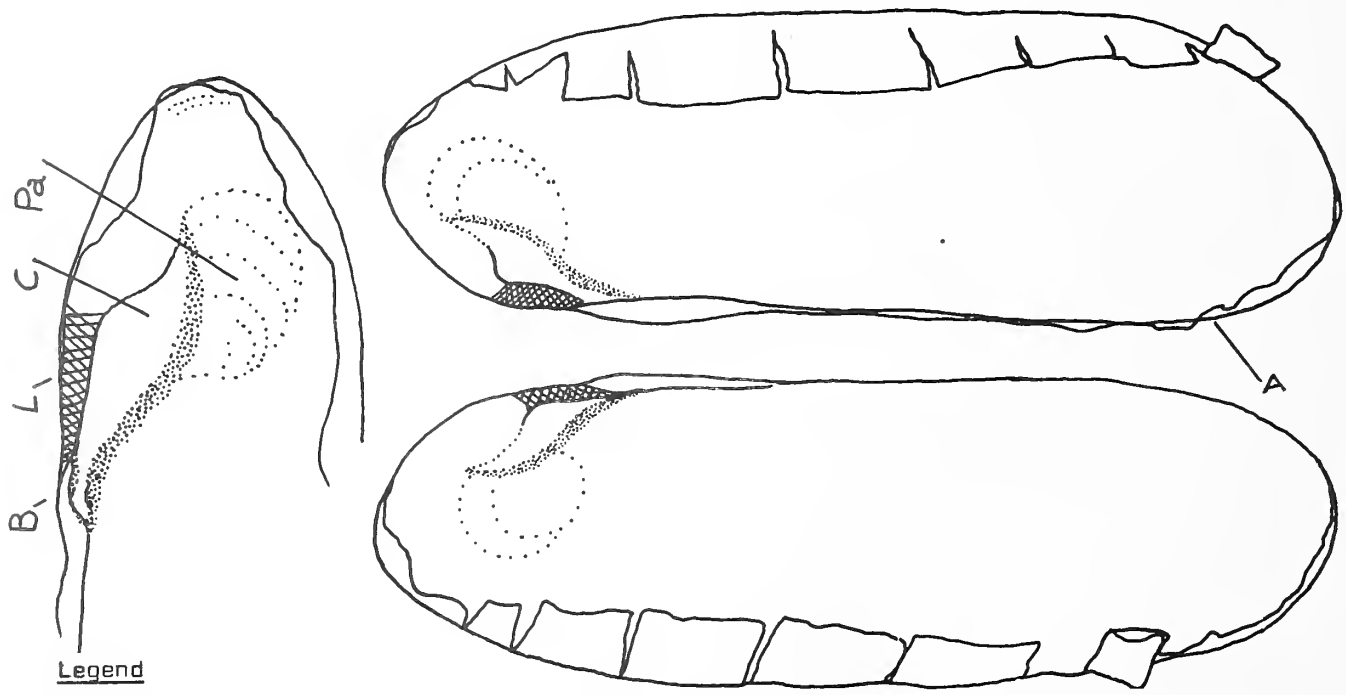


Fig. 4: Solemya (Petrasma) panamensis Dall, 1908
SDNHM Collection No. 5484
Ex. Fred Baker Collection
Location: Scammons Lagoon, B.C., Mexico
Size: approx. 15 mm.



Legend

B=Beak
C=Chondrophore
L=Ligament
Pa= Posterior adductor scar
P=Prop
A=Anterior

Fig. 5: Solemya (Petrasma) valvulus Carpenter, 1864
SDNHM Collection No. 5484a
Ex. Fred Baker Collection
Location: Scammons Lagoon, B.C., Mexico
Size: approx 14 mm.

with the posterior end downward, observations by both Yonge (1939) and Owen (1961) found Solemya always burrowed with the anterior end downward.

Drew (1900) concluded Solemya velum Say, 1822 lives in hard mud and keeps its burrow open, but Yonge (1939) and Owen (1961) in their observations, found no indication of an opening to the surface.

Solemyidae are deposit feeders. The mollusk situated in its burrow anterior end downward, takes water and bottom material from beneath the surface of the substrate into the mantle cavity anteriorly and expels it posteriorly. In less primitive bivalves the water current is both drawn in and expelled posteriorly through tubular inhalant and exhalant siphons.

Protobranch deposit feeders other than Solemya, for example Nuculidae and Nuculanidae have an enlarged stomach to accommodate the high quantity of inorganic material which passes through. In Solemyidae the size of the stomach is reduced. Yonge (1939) suggests Solemyidae have adapted their gills as food sorters which reject large masses of material. Only certain particles are selected and conveyed to the mouth. Thus very little particulate material enters the stomach. Owen (1961) in observations of gut contents of S. parkinsoni Smith, 1874, supports this conclusion. He suggests, however, the possibility of partial digestion in the mantle cavity leaving only the product of this digestive process to enter the stomach.

Genus Solemya Lamarck, 1818
Subgenus Petrasma Dall, 1908

Dall (1908) reviewed the family Solemyidae, formerly Solenomyacidae. This resulted in a detailed report of hinge types for the Solemya s.s., Petrasma, and Acharax. Subgeneric differences are based upon the placement of the ligament; whether it is internal or external, behind the beaks (opisthodetic), or on both sides of the beaks (amphidetic).

In the subgenus Petrasma, the ligament is opisthodetic and there is no internal exposure of the ligament in front of the chondrophore.

In this paper we will discuss the two species in the subgenus Petrasma from the Panamic province: Solemya (Petrasma) panamensis Dall, 1908 and S. (P.) valvulus Carpenter, 1864.

Dall (1908) in his key describing S. (P.) panamensis states, "Chondrophore with an anterior prop extended as a small rib in front of the adductor scar, no posterior prop." Anterior in this case means anterior to the posterior adductor scar. (Fig. 4).

Keen (1971) describing S. (P.) panamensis states "...there is a small posterior prop supporting the internal ligament." This would seem in direct opposition to Dall's description. Her use of the word "posterior" here is confusing. Dall (1908) in his original description states, "... the chondrophore strong, projecting obliquely backward into the cavity, its front margin prolonged as a narrow elevated rib very obliquely backward in front of the posterior adductor scar;...." He continues in his discussion, to contrast S. (P.) panamensis with S. (P.) valvulus Carpenter, 1864 by saying, "S. valvulus Carpenter is a much smaller species and has no anterior prop to the chondrophore."

In examining specimens of S. (P.) panamensis in the San Diego Natural History Museum collection, we confirmed that the prop supporting the chondrophore is anterior to the posterior adductor scar and that there is no prop posterior to this adductor scar.

The original Latin description of S. (P.) valvulus Carpenter, 1864 gives little detailed information about the hinge. There is no mention of a prop. Dall (1908) in his key describing S. (P.) valvulus states, "Chondrophore without props." In examining specimens of S. (P.) valvulus in the San Diego Natural History Museum collection we found that there is no anterior or posterior prop supporting the chondrophore.

Acknowledgements

We would like to acknowledge the encouragement of Anthony D'Attilio of the San Diego Natural History Museum who read this paper.

Literature Cited

Carpenter, P.P. 1864. New forms of mollusks collected at Cape San Lucas. Ann. & Mag. Nat. Hist. Ser. 3. Vol. 13: 311-312.

Dall. W.H. 1908(a). A Revision of the Solenomyacidae. The Nautilus. Vol. 22 (1): 1 & 2.

Dall, W.H. 1908(b). Reports on the dredging operations off the west coast of Central America.... Bull. Mus. Comp. Zool. 43(6): 205-487. 22pls.

Drew, G.A. 1900. Locomotion in Solenomya and its relatives. Anat. Anz. Vol. 17: 257-266.

Keen, A.M. 1971. Sea Shells of Tropical West America, Second Edition. Stanford Univ. Press, Stanford, Calif., 1,064 pp. 22 pls.

Morse, E.S. 1913. Observations on living Solenomya. Biol. Bull., Vol. 25: 261-281.

Owen, G. 1961. Habits and Nutrition of Solemya parkinsoni (Protobranchia: Bivalvia). Quarterly Jour. of Microscopic Sci. Vol. 102: 15-21.

Yonge, C.M. 1939. The protobranchiate Mollusca; a functional interpretation of their structure and evolution. Phil. Trans. Ser. B, Vol. 230:

NEW PUBLICATION

CLIFTON L. MARTIN

324 Kennedy Lane
Oceanside, California 92054

A REVIEW OF THE TRIVIIDAE (Mollusca: Gastropoda),
by Crawford Neill Cate.
Memoir 10, San Diego Society of Natural History, June 20, 1979.
126 pp., including bibliography and index, 41 pls., 177 figs.
Cost $15. plus tax.

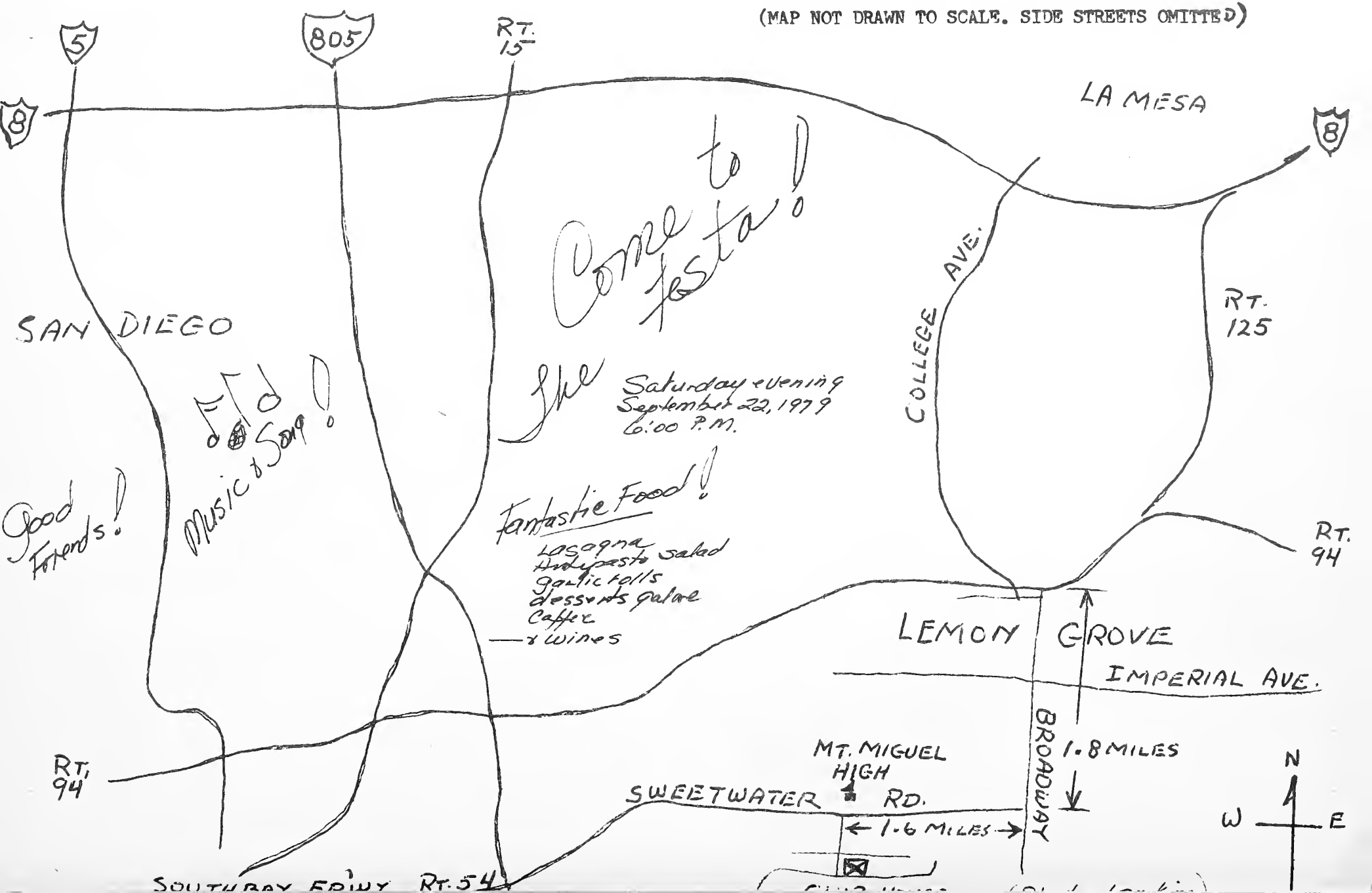
This long-awaited work has finally been published and together with his previous publication, A SYSTEMATIC REVISION OF THE RECENT CYPRAEID FAMILY OVULIDAE (MOLLUSCA: GASTROPODA), published as a supplement to THE VELIGER, vol. 15, 1973, completes Mr. Cate's coverage of the allied Cypraea. Since this present work is the first comprehensive coverage of the Triviidae since the publication of Joyce Allan's COWRY SHELLS OF WORLD SEAS, 1956, many new names are to be expected. More than 40 new species and subspecies are described in this work. Synonomies, with bibliographical references, are given with each species listed. The hundreds of excellent photographs are the work of Bertram C. Draper and type specimens have been used as models in all instances where the type's locality is known. This important new publication is recommended to all who work with, or have an interest in, this family of mollusks.

Bring ems
1.- Your food contribution.
2.- Serving utensils
3.- eating utensils
4 - and yourself in party mood and dress.

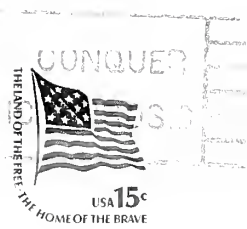
Helen rEd Uoso 464-8308

TERRACE MOBILEHOME PARK CLUB HOUSE
1815 SWEETWATER RD. ACROSS FROM
MT. MIGUEL HIGH SCHOOL IN LEMON GROVE.

(MAP NOT DRAWN TO SCALE. SIDE STREETS OMITTED)



SAN DIEGO SHELL CLUB
% C HERTZ
3883 MT. BLACKBURN AVE
SAN DIEGO, CA. 92111



THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI October 1979 No. 10

PROGRAM: DRY SHELLING is the title of the illustrated talk to be given by Hugh Bradner.

Bring interesting shells for exchange. Immediately after the talk there will be an opportunity for exchanging of shells.

There will be corals on sale at this meeting.

CONTENTS

Club News..... 78

Library Notes..... 78

Range Extension for Isognomon janus Carpenter, 1857 (Bivalvia)
MYERS, B.W. & A. D'ATTILIO 79

Minute Shells - Bittium mexicanum Bartsch, 1911
HERTZ, J. 82

Corrections & Additions to the Catalogue of the Family Coralliophilidae
D'ATTILIO, A. 83

LIBRARY NOTES

The following have been received for the Club library from the Los Angeles County Museum of Natural History.

CONTRIBUTION IN SCIENCE - LACM(NH)

#100 May 1966 - A new genus of Fissurellidae and a new name for a misunderstood species of west American Diodora by James H. McLean.

#109 - October 1966 - A New Haliotid from Guadalupe Island, Mexico (Mollusca: Gastropoda) by Robert R. Talmadge.

#116 - December 1966 - Recognition of the Cancellariid genus Neadmete Habe, 1961, in the west American fauna, with description of a new species from the Lomita Marl of Los Angeles County, California by George P. Kanakoff and James H. McLean.

#185 - April 1970 - Five new Epitoniid gastropods from the west coast of the Americas by Helen DuShane.

#189 - May 1970 - Reinstatement of the turrid genus Bellaspira Conrad, 1868 (Mollusca: Gastropoda) with a review of the known species by James H. McLean and Leroy H. Poorman.

#278 - August 1976 - Living Chamidae of the Eastern Pacific (Bivalvia: Heterodonta) by F.R. Bernard.

#307 - March 1979 - A new Monoplacophoran Limpet from the Continental shelf off southern California by J.H. McLean.

BULLETIN OF THE LACM(NH) SCIENCE

#9 - January 15, 1971- Hybridization in the Eastern Pacific Abalones (Haliotis) by Buzz Owen, James H. McLean & Richard J. Meyer

#16 - February 20, 1973 - Intertidal Mollusks of Iquique, Chile by Louie Marincovich Jr.

ON THE PARTY

MARGE BRADNER

The ITALIAN FESTA was a great success! Vino, lasagna and delicious desserts satisfied our appetites. Italian tourist phrases and their translation stimulated our minds. Singing around the piano soothed our souls. Many thanks to our genial hosts, Ed and Helen Voso for their warm hospitality.

NEW MEMBERS

Allan, Patricia & Bruce (son), 3215 La Costa Ave., Carlsbad, Ca. 92008
436-7022
Beeler, Irene, 1868 Gainsborough Dr., Chamblee, Ga. 30341
DuShane, Helen, 15012 El Soneto, Whittier, Ca. 90605
Marriott, Mabel L., 1304 E Ave. I Space #18, Lancaster, Ca. 93534

CHANGES OF ADDRESS

Minor, Mr. & Mrs. Michael, DMS Box 1597, F.P.O. Seattle, Wa. 98762
DeHahn, Lynn & Ken, 645 Melrose, Chula Vista, Ca. 92010
Fisichella Melba, Phone 583-3696

RANGE EXTENSION FOR ISOGNOMON JANUS CARPENTER, 1857 (BIVALVIA)

BARBARA W. MYERS & ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

We have identified a specimen of Isognomon janus Carpenter, 1857 collected in March 1975 from 65 feet of water off Pt. Loma, San Diego, California. This single specimen was found live attached to a red abalone, Haliotis rufescens Swainson, 1822. It is retained in the Myers collection.

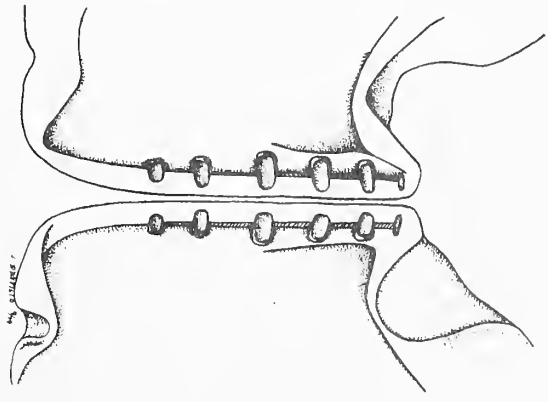
Isognomon janus is very similar to I. recognitus (Mabile, 1895), but differs by the presence of radiating striae on the valves instead of the concentric lamellae of I. recognitus. I. recognitus has 6 to 12 deep regularly spaced ligamental pits, whereas I. janus has 7 to 9 at unequal distances (Keen, 1971). Dall(1921) gives the range for I. recognitus from the Coronado Islands to Chile. Keen (1971) gives it as northern Baja California, Mexico to Chile. Keen (1971) gives the range for I. janus as San Ignacio Lagoon, Baja California to Oaxaca, Mexico. Reeve (1858) figured a shell similar to I. janus under the name Perna anamoides giving California as the locality. However, the label presently on the type specimen in the British Museum reads Torres Straits (Aust.) (Keen, 1971). In the Minutes of the Conchological Club of Southern California (1944) there is a note reported by the editor that A.M. Strong suggests that the record of I. recognitus as far north as the Coronado Islands, Mexico, may be actually that of I. janus.

Carpenter's drawings of I. janus from Tablet 689 of the Reigen collection of Mazatlan shells in the British Museum (Brann, 1966), present the exterior of two valves and the interior of one valve. No ligamental pits are visible in the drawing of the interior of the valve. Carpenter (1857) stated that Tablet 689 contains one pair and two valves, "very young." He explained that the hinge line is narrow without pits when young.

Jackson (1890), Trueman (1954) and Yonge (1968) described the early growth stages of this multivincular or many-bonded ligament in other species of the genus and observed that it begins with a single pit or resilium. As the shell grows, new cartilage pits originate on the hinge line posteriorly.

Keen (1968) figured the interior of one valve of I. janus from Carpenter's Tablet 690 of the Reigen collection. This valve has five ligamental pits and the specimen measured 47 mm, diagonal length. Carpenter (1857) considered the specimen figured on Tablet 690 "the most characteristic specimen."

Figure 1 is a drawing of the ligament of our specimen of I. janus showing six small irregularly spaced pits and the narrow hinge line. The pit at the anterior end is only visible under magnification. This is the original pit or resilium. The smallest pit at the posterior end is the most recent.



a = anterior
p = posterior

Fig. 1. Ligament of Isognomon janus Carpenter, 1857. Leg: J.D. Myers Pt. Loma, San Diego, Ca. 65 ft., March 1975

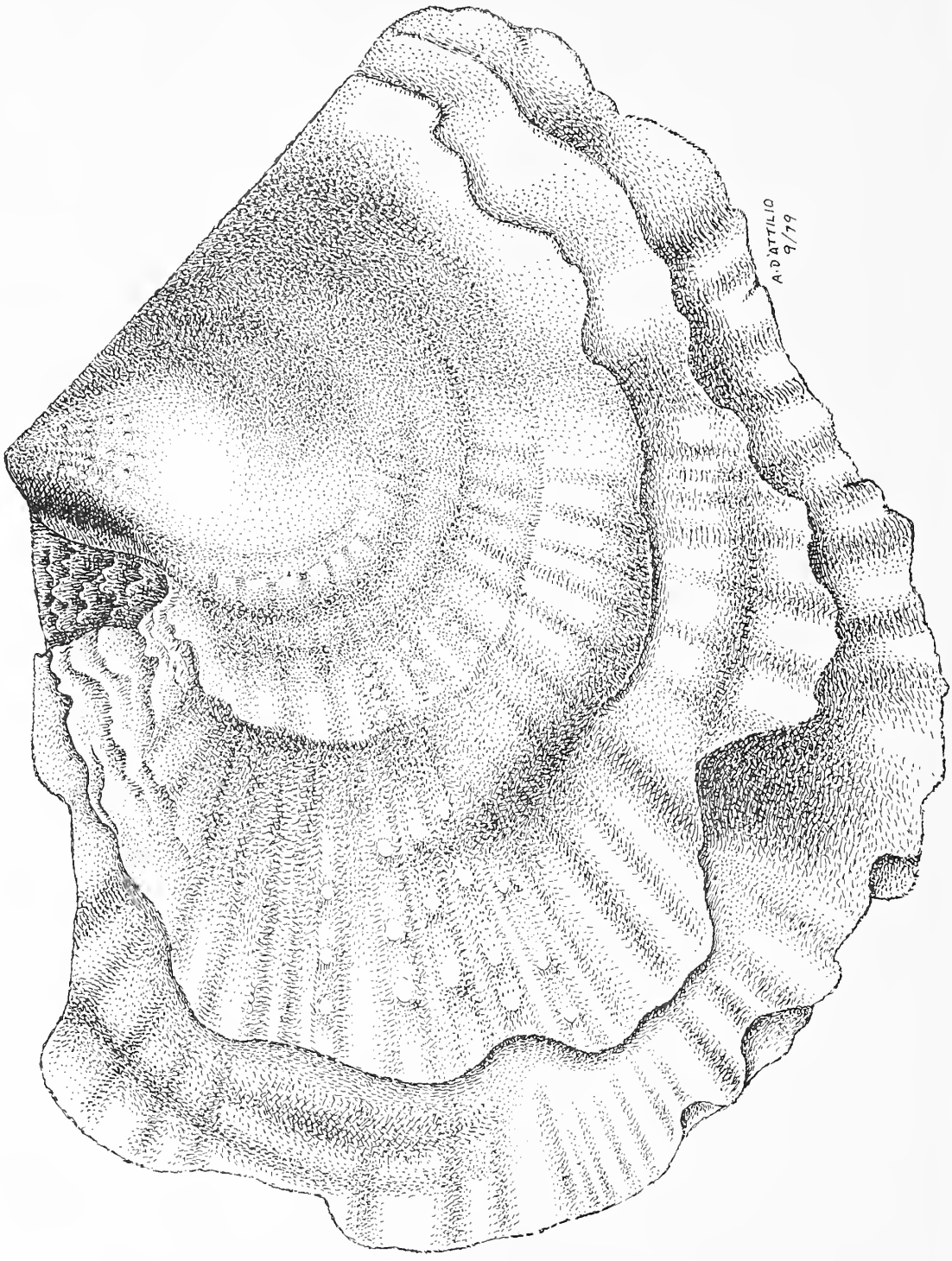


Fig. 2. Exterior of left valve of I. janus Carp., 1857
Size: 27 mm x 23 mm
Leg: John D. Myers
Location: Off Pt. Loma, San Diego, Ca. in 65 ft.
March 1975

Figure 2 is a drawing of the exterior of the left valve of our specimen showing faintly nodulose radiating striae. (The left valve is the valve in your left hand when the beaks point away from you). Nodes are visible near the beak. These were the bases of the imbricating spines (since eroded) present in the early growth stage as mentioned by Carpenter (1857). The shell is composed of two different layers of material, the inner layer nacreous and durable, the outer layer thin and perishable. The valves lack concentric lamellae, but show lines where part of the outer shell layer has flaked off. The prodissoconch is visible only when the valves are viewed obliquely (tipped up) and is "Venus-shaped" as mentioned by Carpenter (1857).

Literature Cited

Brann, D.C. 1966. Illustrations to "Catalogue of the collection of Mazatlan shells" by Philip P. Carpenter. Paleontological Research Institute, Ithaca, New York. 111 pp., 56 pls.

Burch, J.Q. ed. 1944-46. Distributional list of the West American marine Mollusca from San Diego, California to the Polar Sea. (Extracts from the Minutes of the Conchological Club of Southern California part I, Pelecypoda #34 p. 9.

Carpenter, P.P. 1857. Catalogue of the collection of Mazatlan shells in the British Museum. Reprinted Paleontological Research Institute, Ithaca, New York. 1967. 552 pp.

Dall, W.H. 1921. Summary of marine shellbearing mollusks of the northwest coast of America... Bull. U.S. Nat. Mus. 112, 217 pp., 22 pls.

Jackson, R.T. 1890. Phylogeny of the Pelecypoda, the Aviculidae and their allies. Mem. Boston Soc. of Nat. Hist. 4 (8): 277-398., 27 pls.

Keen, A.M. 1968. West American Mollusk Types at the British Museum (Nat. Hist.) IV. Carpenter's Mazatlan Collection. Veliger. 10 (4):389-439, pls. 55-59., 171 figs.

Keen. A.M. 1971. Sea Shells of Tropical West America. 2nd Ed. Stanford Univ. Press, Stanford, Ca. 1,064 pp., 22 pls.

Trueman, E.R. 1954. The structure of the ligament of Pedalion (Perna). Proc. Malac. Soc. (London) 30: 160-166., 4 figs.

Yonge, C.M. 1968. Form and habit in species of Malleus (including the "Hammer oysters") with comparative observations on Isognomon isognomon. Biol. Bull. Marine Lab., Woods Hole, Mass. 135: 378-405., 13 figs.

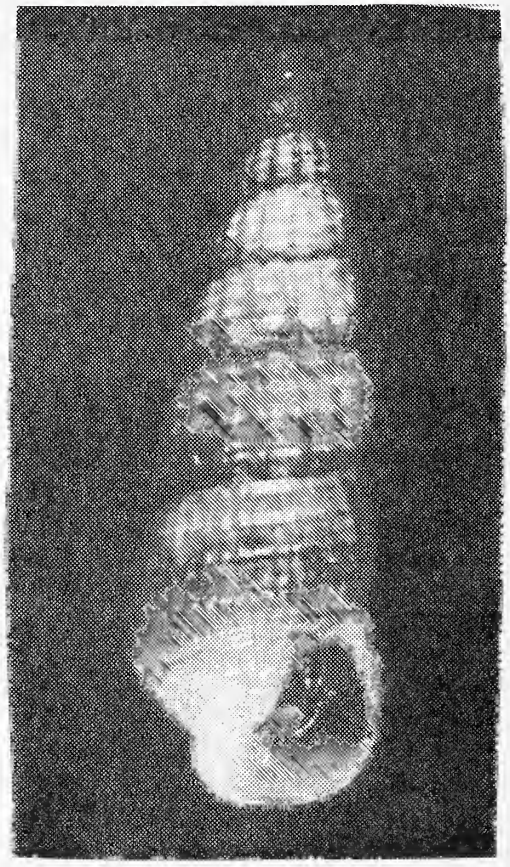
MINUTE SHELLS

BITTIUM MEXICANUM BARTSCH, 1911

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box. 1390, San Diego, California 92112

The specimen pictured here was dead collected intertidally at Shell Beach, La Jolla, California in July 1978 by J. Hertz and has been tentatively identified as Bittium mexicanum Bartsch, 1911. It agrees in almost all aspects with Bartsch's original description and figure. The shell is elongate-conic in shape and light brown in color. It has a complete nuclear whorl whereas Bartsch's type (Cat. No. 126774, U.S.N.M.) was decollated. The specimen figured here differs from the figure of the type in the absence of a cord in each of the sutures.



Bittium mexicanum Bartsch, 1911
Length: 8.5 mm; Width: 2.8 mm.

The remainder of the sculpture agrees well with Bartsch's original description, i.e. "Intersections of the axial ribs and spiral cords form low, rounded tubercles, while the spaces inclosed between them are rectangular pits, having their long axes parallel with the spiral sculpture on all but the last whorl; on this they are squarish pits. Sutures strongly constricted. Periphery of the last whorl marked by a channel. Base moderately long, concave, marked by six feeble, spiral cords, grouped in two series of three, one of which is immediately below the periphery and the other surrounds the base of the columella. Aperture irregularly ovate, channeled anteriorly; posterior angle acute; outer lip thin, showing the external sculpture within, rendered sinuously by the external sculpture; columella oblique, somewhat twisted, and reflected."

The type specimen came from the Gulf of California. If the pictured specimen is truly B. mexicanum, this would represent a large range extension for the species. Bittium species are quite often highly variable within a given lot, and therefore the sculpture difference noted might be just normal variation.

Literature Cited.

Bartsch, P. 1911. Proc. U.S.N.M., Vol. 40: 412-413. pl. 58, fig. I. (May 12).

CORRECTIONS AND ADDITIONS TO THE CATALOGUE OF THE FAMILY CORALLIOPHILIDAE

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

The following paper was submitted to me by Henk K. Mienis, Zoological Museum, Hebrew University of Jerusalem. It consists of corrections or additions as follows.

CORRECTIONS

p. 71: entrance LATIMUREX Coen, 1922 should read:
LATIROMUREX Coen, 1922 (cf. D'Attilio & Bertsch, 1979:21).

p. 90: entrance ruderatus "Monterosato" Coen, 1922, etc. has to be deleted. (Monterosato's manuscript name: ruderatus, was validated in 1896 by Sturany. See under additions).

p. 92: entrance sofiae Aradas & Benoit, 1870. Murex, should read:
sofiae Aradas & Benoit, 1876. Murex
(This work is dated 1870 on the title page, however, only the first part containing the pages 1-113 and plates 1-2, was published in that year. It contains the Bivalvia, Brachiopoda and Pteropoda. Of the Gastropoda the pages 114-226 were published in 1874, and the pages 227-324 and plates 3-5 in 1876. The latter part contains the description of Murex sofiae).

ADDITIONS

Nominal Genera

ARADASIA Settepassi, 1970.
Type species: Murex sofiae Aradas & Benoit, 1876. Conch. viv. mar. Sicilia, p. 270, pl. 5, fig. 7. (O.D.)

ARADOMUREX Coen, 1947.
Type species: Murex sofiae Aradas & Benoit, 1876. Conch. viv. mar. Sicilia. p. 270, pl. 5, fig. 7. (O.D.)

Nominal Species

alucoides var. scabrida Monterosato, 1890. Pseudomurex
1890 Monterosato, T.A. di, Conchiglie delle profondita del Mare di Palermo. Il Naturalista Siciliano, (1) 9 (8):181-191 (p. 183). Sardinia.

babelis var. regalis Requien, 1848. Fusus
1848 Requien, F., Catalogue des Coquilles de l'ile de Corse, I-Xii & 13-111 (p. 76). Corsica, Bonifacio, in Madreporis.

cariniferus var. coronaria Monterosato, 1890. Pseudomurex
1890 Monterosato, T.A. di, Conchiglie delle profondita del Mare di Palermo. Il Naturalista Siciliano, (1) 9 (8): 181-191 (p. 183). Algeria (here selected).

cariniferus var. exerta Monterosato, 1890. Pseudomurex
1890 Monterosato, T.A. di, Conchiglie delle profondita del Mare di Palermo. Il Naturalista Siciliano, (1) 9 (8): 181-191 (p. 183). Sicily, Palermo.

craticulatus var. pianosana Sturany, 1896. Fusus
1896 Sturany, R., Zool. Ergebn. VII, Mollusken 1 (Prosobr. & Opisthobr.; Scaph.; Lamell.) gesammelt von S.M. Schiff "Pola" 1890-1894. Denkschr. Math.-Nat. Wiss. Cl. Kais. Akad. Wiss. Wien, 63, 1-36, 2 pls. (reprint pagination) (p. 25, pl. 2, figs. 40-41). Adriatic Sea. between Tremiti and Pianosa. at a depth of 103 m.

meyendorffi var. caprensis Bellini, 1929. Pseudomurex
1929. Bellini, R., I molluschi del golfo di Napoli. Ann. Mus. Zool. R. Univ. Napoli, (N.S.) 6(2): 1-87. (38).
Italy, Capri, deep water.

nakamigawai io Kilburn, 1974. Latiaxis (Babelomurex)
1974. Kilburn, R.N., Taxonomic notes on South African marine Mollusca (3): Gastropoda: Prosobranchia, with descriptions of new taxa of Naticidae, Fasciolariidae, Magilidae, Volutomitridae and Turridae. Ann. Natal Mus., 22 (1): 187-220. (p. 201, fig. 12a). South Africa, trawled off Durban in 150 fathoms.

ruderatus Sturany, 1896. Pseudomurex
1896. Sturany, R., Zool. Ergebn. VII, Mollusken 1 (Prosobr. & Opisthobr.; Scaph.; Lamell.) gesammelt von S.M. Schill "Pola" 1890-1894. Denkschr. Math.-Nat. Wiss. Cl. Kais. Akad. Wiss. Wien, 63, 1-36, 2 pls. (reprint pagination) (p. 26 & p. 36, pl. 2, figs. 42-43). No locality mentioned.

scalaris "Brocchi" Weinkauff, 1868. Coralliophila
1868. Weinkauff, H.C., Die Conchylien des Mittelmeeres, ihre geographische und geologische Verbreitung, II. Mollusca Cephal. 1-512. (p. 98). (not Murex scalaris Brocchi, 1814)
On corals off the coast of Dalmatia.

GENERIC REFERENCES

Coen, G.S., 1947. Appunti di malacologia Mediterranea. Acta Pontificia Academia Scientiarum, 11 (7): 79-92.

Settepassi, F., 1967-1970. Atlante Malacologico Molluschi Marini Viventi del Mediterraneo, I: LX, pl. 1 Roma. (It is impossible to give a more exact account of the correct pagination of this work. In one volume Settepassi started 4 or 5 times with pages 1. Therefore only the page dealing with Aradasia is quoted, which taxon was placed by him in the Buccinidae!).

ADDITIONS OF TAXA DISCOVERED BY THE AUTHOR OF THE CATALOGUE SUBSEQUENT TO ITS PUBLICATION

filiaris Shikama, 1978. Latiaxis (Tolema)
1978. Shikama, T., Descriptions of new and noteworthy gastropoda from the western Pacific Ocean (1). Sci. Rep. of the Yokosuka City Museum, No. 25, pp. 35-42, 1 pl. (p. 38, pl. 7, figs 17, 18), (Dec.)
Southwest Taiwan.

fusiformis Shikama, 1971. Coralliophila (Fusomurex?)
1971. Shikama, T. On some noteworthy marine gastropoda from southwestern Japan (III). Sci. Rep., Yokohama, Nat. Univ., Sec. 2, no. 18, pp. 27-35, 1 pl. (p. 30-31, pl. 3, figs. 13-16). Isshiki, Mikawa.

isshikiensis Shikama, 1971. Coralliophila (Hirtomurex)
1971. Shikama, T. On some noteworthy marine gastropoda from southwestern Japan (III). Sci. Rep., Yokohama, Nat. Univ., Sec. 2, no. 18, pp. 27-35, 1 pl. (p. 30, pl. 3, figs. 11, 12). Isshiki, Mikawa

kanamarui Shikama, 1978. Latiaxis (Babelomurex)
1978. Shikama, T. Descriptions of new and noteworthy gastropoda from the western Pacific Ocean (1). Sci. Rep. of the Yokosuka City Museum, No. 25, pp. 35-42, 1 pl. (p. 39-40, pl. 7, figs. 25, 26). (Dec.) Tosa, Japan

kawamurai Shikama, 1978. Coralliophila (Hirtomurex)
1978. Shikama, T. Descriptions of new and noteworthy gastropoda from the western Pacific Ocean (1). Sci. Rep. of the Yokosuka City Museum, No. 25, pp. 35-42, 1 pl. (p. 40, pl. 7, figs 27-30). (Dec.) Tosa, Japan

michikoae Shikama, 1978. Latiaxis (Babelomurex)
1978. Shikama, T. Descriptions of new and noteworthy gastropoda from the western Pacific Ocean (1). Sci. Rep. of the Yokosuka City Museum, No. 25, pp. 35-42, 1 pl. (p. 39, pl. 7, figs. 21-24). (Dec.) Tosa, Japan

regius Shikama, 1978. Latiaxis (Tolema)
1978. Shikama, T. Descriptions of new and noteworthy gastropoda from the western Pacific Ocean (1). Sci. Rep. of the Yokosuka City Museum, No. 25, pp. 35-42, 1 pl. (p. 38-39, pl. 7, figs. 19, 20) (Dec) Southwest Taiwan

scobina Kilburn, 1973. Latiaxis
1973. Kilburn, R.N. Notes on some benthic Mollusca from Natal and Moçambique, with descriptions of new species and subspecies of Calliostoma, Solariella, Latiaxis, Babylonia, Fusinus, Bathytoma and Conus. Ann. Natal Mus. Vol. 21(3), pp. 557-578, 17 figs. (p. 567, fig. 9a).
Type: Trawled off Durban in 80 fathoms.

CORRECTIONS AND ADDITIONS TO --A SELECTED BIBLIOGRAPHY

CORRECTION

On p. 95 the following is the corrected citation.

Gohart, H.A.F. & Soliman, G.N. 1963. On the biology of three Coralliophilids boring in living corals. Pub. Mar. Biol. Sta. Al-ghardaqua 12: 99 - 126, 26 figs. 1 pl.

ADDITIONS

D'Attilio, A. & H. Bertsch. 1979. Preliminary Account of Three Generic Taxa in the Muricacean Family Coralliophilidae. FESTIVUS. Vol. XI (3) pp. 21-25. 6 figs. (Mar.)

Wells, F.E. & C.M. Lalli. 1977. Reproduction and Brood Protection in the Caribbean Gastropods Coralliophila abbreviata and C. caribaea. Jour. Moll. Stud. (43): 79-87. 4 figs.

SAN DIEGO SWIM CLUBS
% S. PEREZ
2863 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO
JUL 12
PM
1979

GIVE
THE UNITED WA

Special Olympics

Skill · Sharing · Joy
USA 15c

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY
CASA DEL PRADO BALBOA PARK
ROOM 104 7:30 P.M.

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00: Overseas surface $4.50; Student membership $3.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Ca. 92111.

Vol. XI November 1979 No. 11

PROGRAM: Dave Mulliner will give an illustrated presentation on Interdependence of Underwater Marine Life.

Date: Nov. 15. Time: 7:30 P.M. Room: 104

The Christmas Party: Dec. 8. La Sala Room, Cafe Del Rey Moro. (see next page for details).

CONTENTS

Club News 87

Interpretation of Typhine Morphology with Special Reference to TYPHISALA CLARKI (Keen & Campbell, 1964).
GEMMELL, J. & A. D'ATTILIO..... 88

Selected index for 1979 94

REMINDER: THE FESTIVUS DOES NOT PUBLISH A DECEMBER ISSUE.

FROM THE MINUTES

KAREN HOGAN

The October 18, 1979 meeting of the San Diego Shell Club was called to order by President Hugh Bradner at 7:50 P.M. Many new visitors were greeted and members were requested to remain for the business portion of the meeting.

Hugh Bradner's talk was "Dry Shelling" an alternative to the getting wet type of shell collecting. After showing many beautiful slides of the specimens he had collected while dry shelling, the group joined in listing the many ways of obtaining shells without getting wet. Some of the more unusual were from sea captains, grave robbing, counterfeiting, fertilizer factories and antique stores.

After a short break for coffee and cookies, the business portion of the meeting commenced. The minutes were accepted and the proposed slate of officers for 1980 was presented as follows:

President: Sandie Seckington
Vice Pres: David K. Mulliner
Secretary: Carol Burchard (Recording)
Secretary: Karen Hogan (Corresponding)
Treasurer: Walter Robertson
Editor: Carole M. Hertz (FESTIVUS)
Librarian: Barbara W. Myers

Nominations from the floor will be entertained before the election at the November meeting. It was also requested that June King continue as telephone chairman and Botanical Foundation representative for 1980.

After reading correspondence received by the Club, the meeting was adjourned.

THE CLUB'S GALA ANNUAL CHRISTMAS PARTY

The Club's annual Christmas party will be held on Saturday, Dec. 8 in the La Sala Room of the Cafe Del Rey Moro in Balboa Park. The festivities will begin at 6:00 P.M. with a no host cocktail hour. Dinner will be at 7:15 P.M.

Menu: Tossed salad, Hot rolls and butter
Chicken Cordon Bleu
Au gratin potatoes and green vegetable
Chocolate mousse, Choice of coffee or tea
The Club will provide complimentary dinner wine.

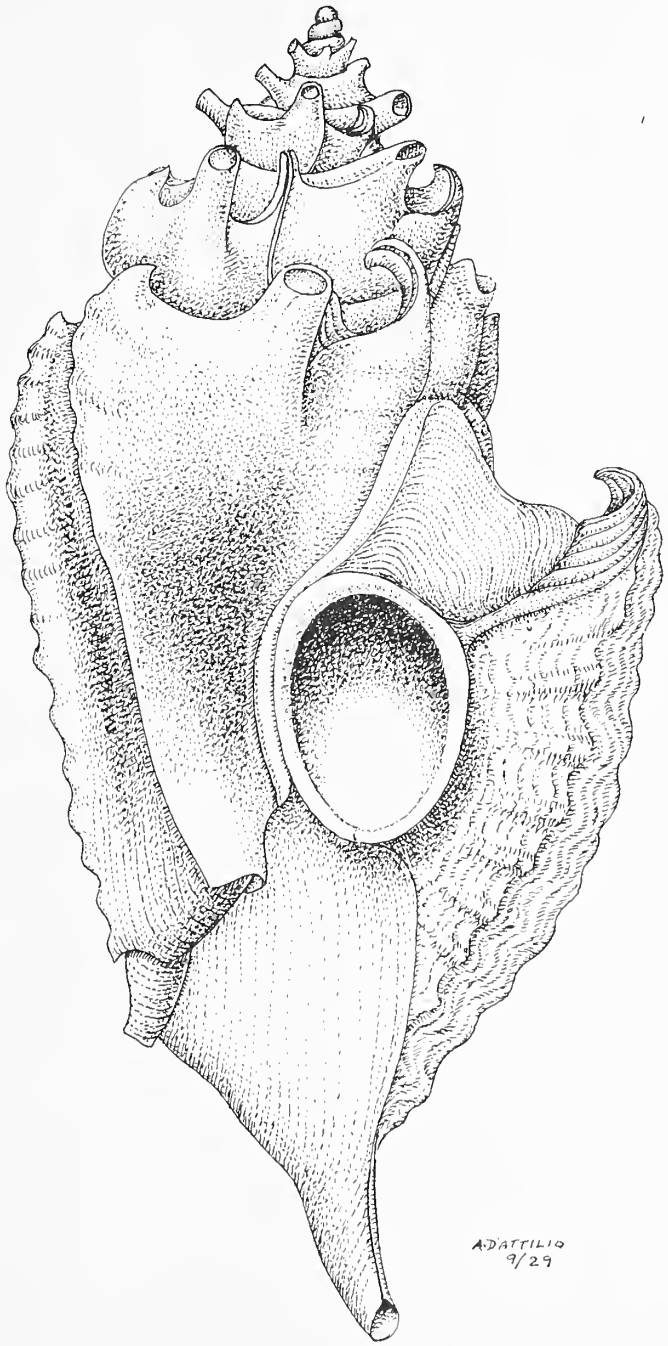
Dinner with gratuity and tax is $8.00. Reservations must be in by Dec. 3. Make check payable to San Diego Shell Club, Inc. and give to the treasurer at the November meeting or send to the Club address (front page).

Following dinner, the Madison High Honor Ensemble under the direction of Gilbert Sloan will again warm our spirits with a Christmas Choral program.

As is traditional, we will again have a shell gift exchange. To participate, bring your gift wrapped shell to place under the tree. Place data and name inside the package only. On the outside just list general locale i.e. Indo-Pacific, Gulf, etc. Numbers are drawn and those who bring a shell gift choose one from under the tree.

Come to the party--all your friends will be there. Guests welcome.

THE FESTIVUS
SAN DIEGO SHELL CLUB
VOL. XI November, - NO. II



TYPHISALA CLARKI KEEN & CAMPBELL

INTERPRETATION OF TYPHINE MORPHOLOGY

JOYCE GEMMELL, ANTHONY D'ATTILIO
SAN DIEGO NATURAL HISTORY MUSEUM

INTERPRETATION OF TYPHINE MORPHOLOGY

WITH SPECIAL REFERENCE TO *TYPHISALA CLARKI* (KEEN & CAMPBELL, 1964)

JOYCE GEMMELL & ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Introduction

The Typhinae, a subfamily of the Muricidae, has been reviewed and catalogued by various authors over the past one hundred years. Montfort in 1810 described the genus *Typhis*, Type species (by original designation) *Purpura tubifer* Bruguiere, 1792, from a fossil species and Jousseaume in 1879 made subdivisions of the then small group of about twelve recent and fossil specimens.

Sixty five years later, Keen (1944) classified eighty five forms both recent and fossil. In 1961, Vella working on Australasian Typhinae regrouped the current genera and subgenera and described eight new fossil and recent species. In 1964 Keen and Campbell, having undescribed specimens both recent and fossil and distributional information, described ten more new species and a new genus from the western and eastern Pacific and Australia.

The generic divisions were based on shell characteristics of alternating tubes and varices, a closed anterior canal and a continuous ovate aperture. Tube and spine formation, placement and direction, plus nucleus, number of whorls and anterior canal direction accounted for supraspecific divisions. Keen (1944) regarded the placement of the tubes as of primary importance in classification, while Vella (1961) proposed the number of varices per whorl and the intervarical differences as the most important features.

There have been recurring statements by these and other authors concerning the lack of knowledge in regard to the ecology, anatomy and reproductive biology. In recent years, other factors of shell morphology have been reported. D'Attilio (1975) described the generic and intervarical sculpture, and in 1971 D'Attilio and Radwin described the intriticalx layer in *Typhisopsis* and *Tripterotyphis*.

Ecological reports are few and dredging records comprise the bulk of data on depth and bottom type on which the typhines are found, Gertman (1969). A record of 1869 stated that *Typhis sowerbyii* Broderip, 1833 was found on seaweed. Recent intertidal collecting reports have mentioned rock, mud, and sand. Gemmell (1974) reported field observations of *Typhisala clarki* (Keen & Campbell, 1964) including egg capsules and larval development. Although specimen collecting has become more sophisticated in recent years, Gertman (1969) stated that one quarter of the total number of species at that time had been described within eight years. The Typhinae are thus still uncommon with regard to live taken specimens. Keen and Campbell (1964) stated how unusual a circumstance it was to describe a new species with over one hundred and fifty specimens available.

The animal is still poorly known. Dall (1889) suggested the posterior tube as an excretory channel. Baker (1895) described the animal as resembling *Murex* "...with narrow foot and eyes at the base of the tentacles."

H. and A. Adams figured the operculum and animal of Haustellotyphis. Thiele (1929) illustrated the radula of Haustellotyphis cumingii (Broderip, 1833) and afterwards anatomical characters other than the shell began to be used for generic divisions. Figure 1. below shows the radula of Typhisala clarki.

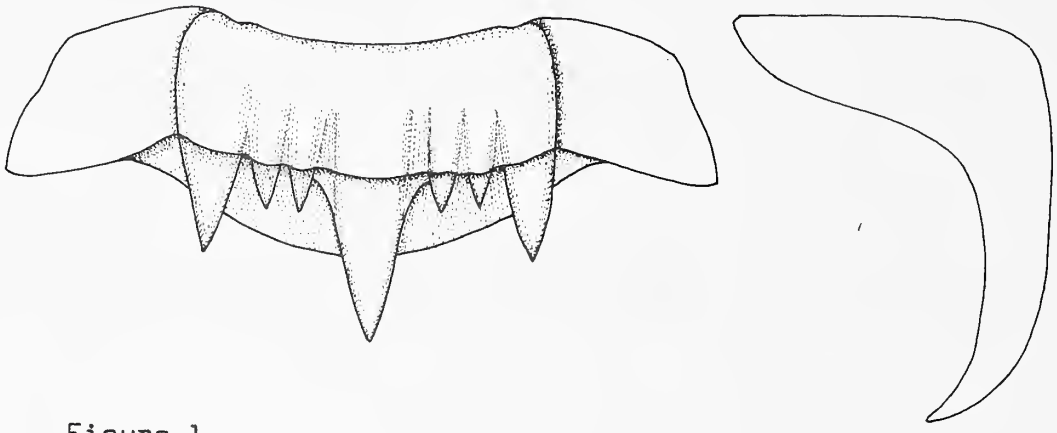


Figure 1.

Very few museum lots have enough specimens of any one species to show growth stages or comparisons of shell growth stages between genera. Morphological characters in the Typhinae are comparatively complex so that simple characters such as length, width, and height do not suffice to establish the nature of shell structure. Factors leading to this complexity of the Typhinae are tubes, lamellar layers and thickening of the shell wall within at the varix. All tubes are, when not functional, sealed from within by deposition of shell matter. Figure 2 shows an internal view of T. clarki, spire removed; a) refers to the original shell wall, b) the wall thickened to make it smoothly spiral.

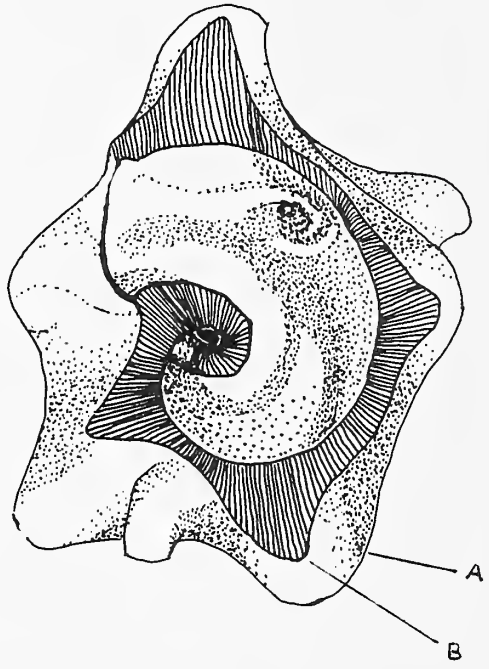


Figure 2. Internal view

The relationship of the mantle to the shell is of primary interest. The mantle with its building cells encircles all shell openings and in the case of Typhis the functional anal tube as well. Since this tube is an internal opening between varices, much remains to be learned regarding the anatomy of the animal. As soon as the new tube is completed, the old tube is sealed over from the inside. This simple step of the animal moving the anal opening over to the next tube supposes the possibility of a protruding anal orifice inserted into the tube. It is assumed that first the mantle continues on past this point in continuing the building of body whorl, spines, and apertural face;

and second that it is possible for the mantle to retract internally and form a fold to repair a broken anal tube from the inside as appears in some specimens.

The shell increases in increments on periodic tangents from the right side to the left (position shell aperture facing you and spire uppermost). At one stage, noted below, the shell is closed from the left to the right. It is very difficult to interpret growth steps from the adult shell which has ceased to form new whorls. In the juvenile or sub-adult shell it is easier to see the direction of the primary layers and the penultimate whorl may still be in a stage of intervarical development or closure.

Observations on the growth stages of Typhisala clarki.

The observations in this paper in regard to growth steps or stages are based on over 20 specimens of Typhisala clarki. The various steps of growth differ somewhat as to genera. The T. clarki here figured are from the Gemmell collection from San Felipe, Baja California, Mexico, in the San Diego Natural History Museum (Lot # G159). The specimens were taken

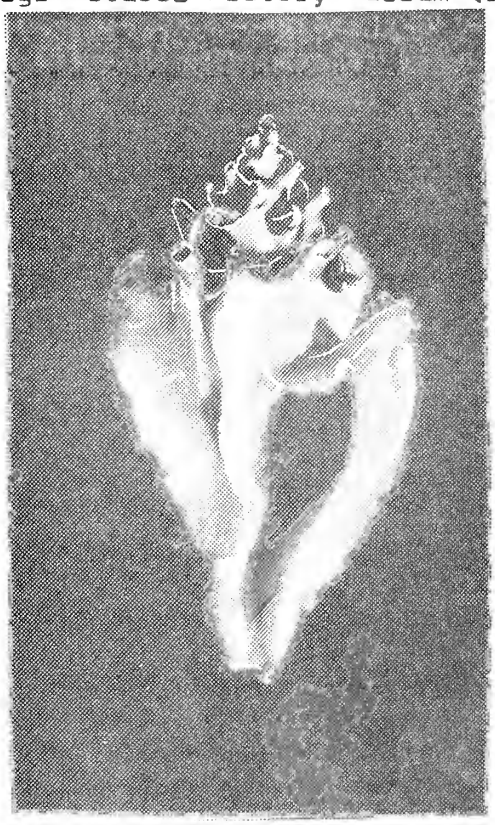


Figure 3a. Length: 12.5 mm

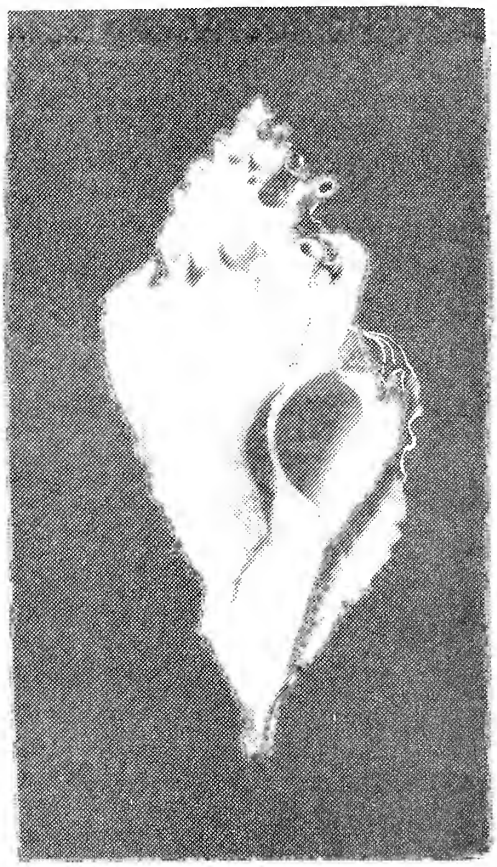


Figure 3b. Length: 22 mm

alive on the south side of San Felipe Point, intertidally at a minus five foot tide. The small population in this area lives along a muddy drainage channel. Silt covers small cobble stones as the tide recedes. As the surface drains and begins to dry, the Typhis push away from the substrate and the outline of the shell becomes visible. The majority of specimens were observed between or on the sides of small rocks, although a smaller percentage were on the tops of the rocks. Figure 3a shows the primary step in tube formation. Figure 3b shows the closure of the anterior canal.

Field observations over a period of several years revealed a seasonal migration. From March to May, the population was in the low intertidal area. As the temperature of the water rose during mid and late summer the mollusks appeared to move out into deeper water and were almost never found during the two coldest months from December to February.

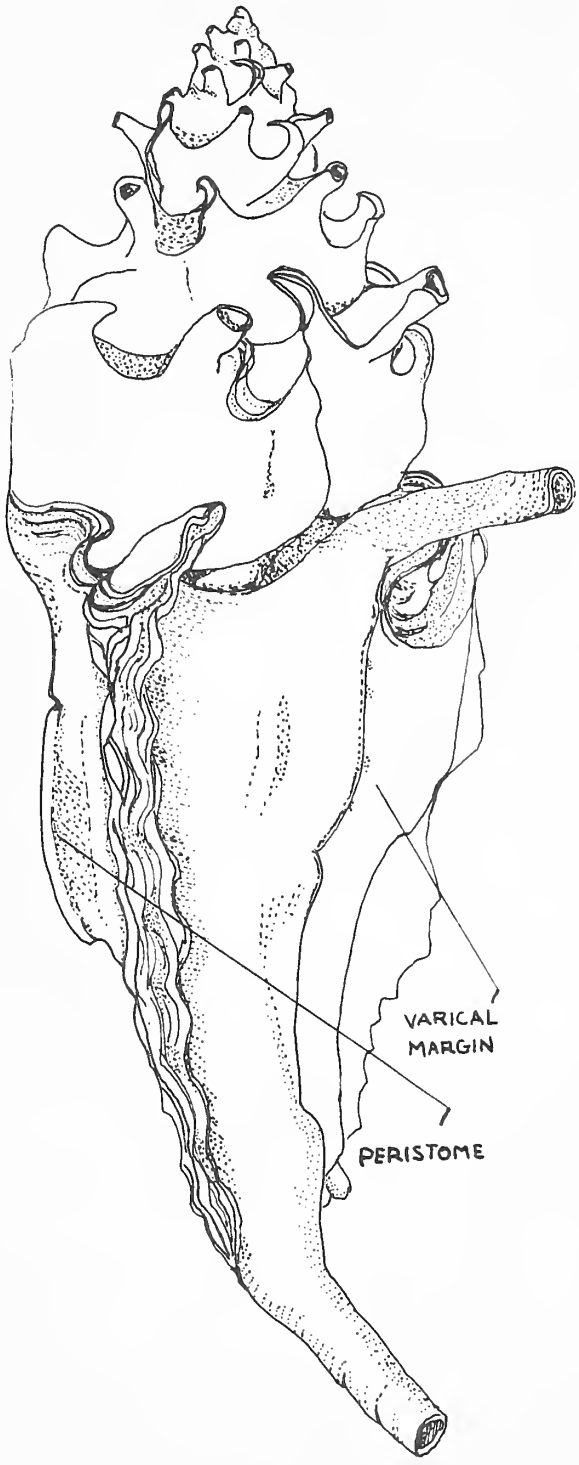


Figure 4.

The Typhisala body whorl terminates with a winglike varix and a turned up spine on the shoulder. A partition or buttress connects the shoulder spine on the right to the whorl above on the left. The last varix in the adult shell, is broad and lamellate with a serrate reflected edge. In the sub-adult the leading edge of the varix is thin, sharply angled to the aperture wall and reinforced from within. The aperture is small, oval, with a raised peristome. The closed anterior canal is set off to the right and when adult, the ventral face is flattened. The anterior siphon is recurved dorsally. Specimens having had optimum growing conditions show rapidly expanding whorls, sharp lamellae, and growth of moderately long anterior and posterior tubes.

To clarify the first step in the formation of the intervarical area, figure 4 shows the old peristome or margin and formation of the new peristome. The growth starts at the peristome. The outer rim of the right side of earlier apertures are visible on the body whorl. The inner rim is resorbed. The shell is opened anteriorly along the columella down to the canal termination. This resorbtion is probably accomplished by the left side of the mantle. Either subsequently or simultaneously, the right side of the mantle forms a tube within a fold of the mantle at the shoulder and appresses it against the earlier made partition. The leading right edge of the mantle continues the exterior dorsal framing rapidly expanding the body whorl. The anal tube shows a suture on the ventral side which continues along the rim of the shoulder and into the spine. Very fine incremental lines curve around the base of the tube on the left terminating along a line, making a suture between the whorl above and the new one.

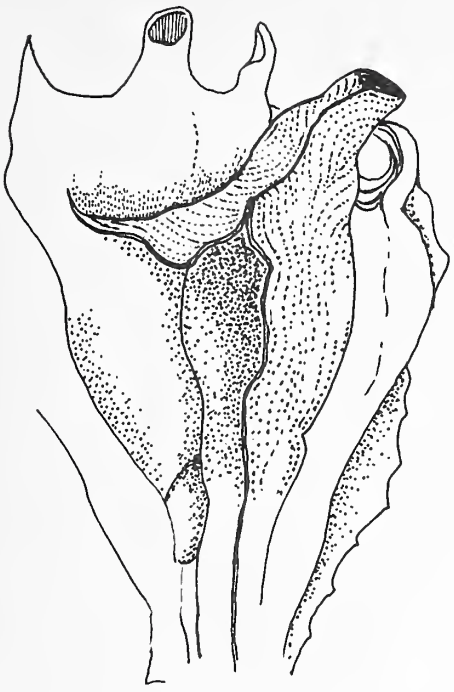


Figure 5.

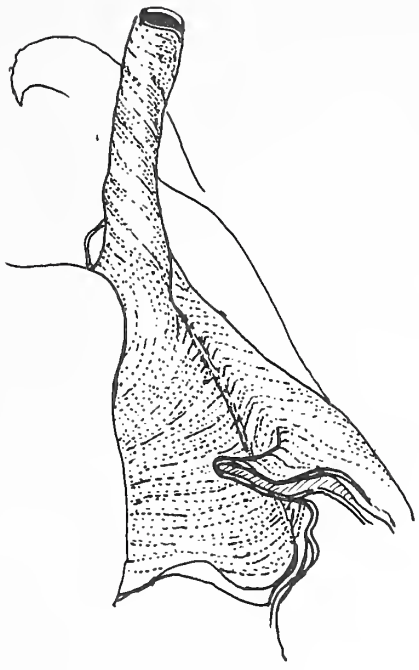


Figure 6.

The flat shelf-like area between the suture and the spine makes an inflectional tangent; that is the spine and the partition are formed by a mantle fold working both on the right and left side of the suture but on different tangents. Figure 5 shows the formation of the tube and Figure 6 shows the formation of the shelf as seen from above.

The shoulder spine is folded but open and not entirely sealed. It is filled in with succeeding layers on a receding angle running the length of the varix along the anterior canal. In Figure 7, (a) shows the lamellate nature of the leading side of the varix and the prolongation of the varix into a spine above. (b) shows the partially formed buttress. Left of the tube suture, the shoulder platform curves up and across the shoulder making the future prop for the next anal tube. This stage of development is figured by Keen (1964) plate 9, fig. 23. The Keen figure also shows the vulnerability of the animal at this period as the expanding varix, due to lack of the enclosed aperture, is wide open from shoulder to anterior end. The left mantle edge now begins to form the apertural rim on the left or columellar side and to close the broad anterior canal from the left with a wall overlapping, slightly, the wall from the right.

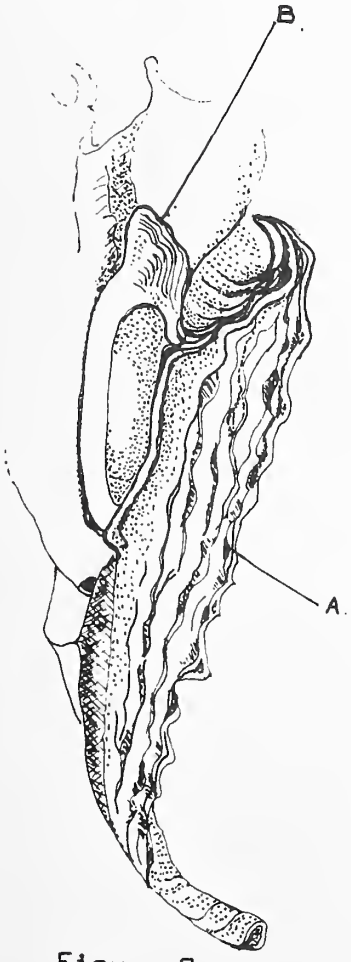


Figure 7.

A suture is made on the ventral face of the closed anterior canal and tube.

The last of the growth increments is to reinforce the raised peristome on the right and left side of the aperture. The rim is higher on the right anterior side and slightly more recurved on the columellar side.

When the shell is adult and the final varix is complete, the spine is usually hooked dorsally, the lamellae on the receding edge are thickened and the ventral face becomes typically flat and broad. In addition, the overlapping of the left anterior side of the shell layer over the right side is much wider. Figure 8 shows the mature partition between the spine below and the spire above.

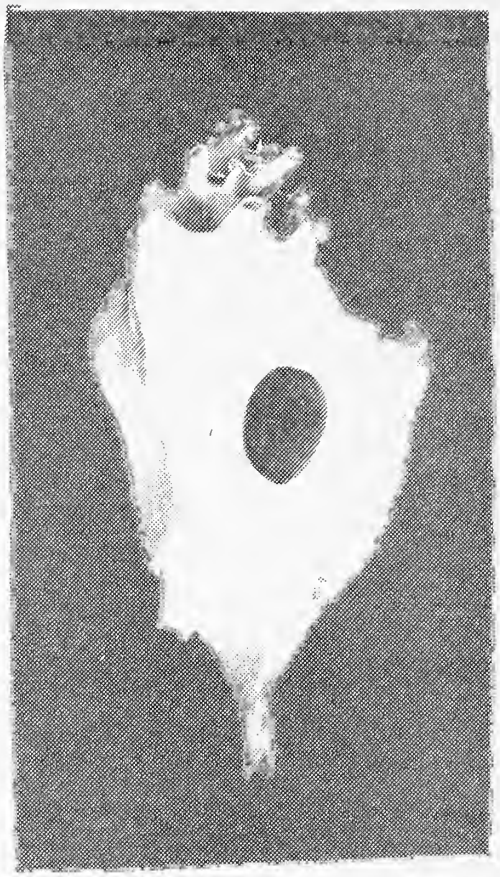


Figure 8. adult T. clarki

Literature Cited

D'Attilio, Anthony. 1975. The Typhine Shell, Theme, Development and Elaboration. FESTIVUS. Vol. 6(9):53.

D'Attilio, Anthony & George E. Radwin. 1971. The intritacalx, an undescribed shell layer in mollusks. VELIGER. Vol. 13(4):344-347, 1 pl., 1 fig.

Gemmell, Joyce. 1974. Notes on egg capsules and larval development of Typhis clarki Keen & Campbell, 1964. FESTIVUS. Vol. 5(3):100-103, 1 pl., 3 figs.

Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. TULANE STUD. GEOL. PALEO. Vol. 7(4):143-191, 3 figs, 8 pls.

Jousseaume, F. 1880. LE NATURALISTE. 2me Année 1(42):335-6.

Keen, A. Myra. 1944. Catalogue and Revision of the Gastropod Subfamily Typhinae. JOUR. PALEO. Vol. 18(1):50-72. Jan.

Keen, A. Myra & G.B. Campbell. 1964. Ten New Species of Typhinae (Gastropoda: Muricidae). VELIGER. Vol. 7(1):46-57. pls. 8-11.

Montfort, Denys de. 1810. CONCHYLIOLOGIE SYSTÉMATIQUE.... Vol. II

Thiele, Johannes. 1929. HANDBUCH SYST. WEICH. (p.293. fig.318).

Vella, P. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. PALEONTOLOGY. 4(3):362-391. pls. 46-47.

A SELECTED INDEX TO VOLUME XI (1979)

Listings are by both title and author. The No. refers to the month, the numbers after the colon to the pages. [ ]Brackets are used for explanation.

Bertsch, Hans.
The eastern Pacific Chromodorids Opisthobranchia: Chromodoridinae. 6:44-46, 1 pl.

Bradner, Hugh.
The sharp-tongued mollusks. [Cypraea] . 2:9-15, 16 figs.

D'Attilio, Anthony
Corrections and additions to the catalogue of the family Coralliophilidae. 10:83-85.
Muricids from Okinawa and the Bohol Straits. 5:36-38. 6 figs.
Tripterotyphis lowei from the Solomon Islands. 7:51-53. 6 figs.

D'Attilio, Anthony & Hans Bertsch.
Preliminary account of three generic taxa in the Muricacean family Coralliophilidae. 3:21-25. 6 figs.

D'Attilio, Anthony & Carole M. Hertz.
The eastern Pacific species of Murex sensu stricto. 8:59-62. 6 figs.

Everson, Gene.
The naming of a new Caribbean volute, Scaphella contoyensis Emerson & Old, 1979. 5:39-40. 2 figs.

Gemmell, Joyce & Anthony D'Attilio.
Interpretation of Typhine morphology with special reference to Typhisala clarki. 11: 88-93, 8 figs.

Gemmell, Joyce, Barbara W. Myers, Carole M. Hertz
Solemyidae: clarification of two species in the subgenus Petrasma 9:73-76. 5 figs.

Hertz, Carole M.
Observations on the differences between the juvenile and mature Turritella anactor Berry, 1957. 6:48-49. 3 figs.
[Ed.] Radwin & D'Attilio paper on Muricacean gastropods provides names for six species pictured in a previous FESTIVUS series. 3:25.

Hertz, Jules.
Collecting in Santa Cruz, California. [Turcica caffea, Astraea gibberosa, Ocenebra inornata]. 8:67-68. figs. 1a,b & 2a, b.
Minute Shells. [Caecum dalli, C. californicum, C. crebricinctum, C. quadrifilatum, Fartulum orcutti, Elephantulum liratocinctum] 1:2-4. 6 figs.
Minute Shells [Elaeocyma hemphillii] . 3:26-28. 1 fig.
Minute Shells. [Caecidae] 4:32-34. 4 figs
Minute Shells. (Update on Turbonilla tridentata Carpenter, 1865. 5:41-42. 1 fig.
Minute Shells Bittium munitum and/or Bittium munitum munitoide. 6:47. 1fig.
Minute Shells Bittium larum Bartsch, 1911. 8:63. 1 fig.
Minute Shells Bittium eschrichtii & Bittium eschrichtii montereyense. 9:70-72. 1 fig.
Minute Shells Bittium mexicanum Bartsch, 1911. 10:82. 1 fig.

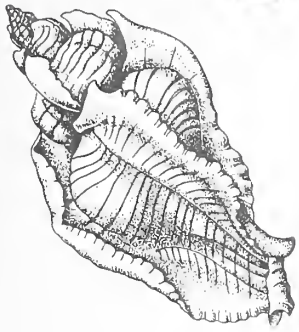
Hertz, Jules & Anthony D'Attilio.
Favartia garrettii (Pease, 1868): notes and corrections to the literature. 2:16-18. 3 figs.

Moore, Mike.
Byssus fiber differences in response to wave shock. [student project outline] 7:55

Myers, Barbara W.
An historical review of the systematics of Orbitestella diegensis (Bartsch, 1907). 8:64-66. 1 fig.
Bathybembix bairdi (Dall, 1889) and the types of some related genera. 1:5-7. 2 figs.
Myers, Barbara W. & Hans Bertsch.
The misidentified Buccinum chartium. 7:56-57. 2 figs.
Myers, Barbara W. & Anthony D'Attilio.
Range extension for Isognomon janus Carpenter, 1857 (Bivalvia). 10:79-81. 2 figs.
Myers, David J.
Food preferences of Scorpaenichthys marmoratus. 8:66.
Poorman, Forrest and Roy.
The San Carlos Rectangle. 4:30-31. 2 figs.

An historical review of the systematics of Orbitestella diegensis (Bartsch, 1907), Myers, B.W., 8:64-66.
Bathybembix bairdi (Dall, 1889) and the types of some related genera. Myers, B.W. 1:5-7. 2 figs.
Byssus fiber differences in response to wave shock. Moore, M. 7:55.
Collecting in Santa Cruz, California (Turcica caffea, Astraea gibberosa, Ocenebra inornata). Hertz, J. 8:67-68, figs 2a,b.
Corrections and additions to the catalogue of the family Coralliophilidae. D'Attilio, A. 10:83-85.
Favartia garrettii (Pease, 1868): notes and corrections to the literature. Hertz, J. & A. D'Attilio. 2:16-18. 3figs.
Food preferences of Scorpaenichthys marmoratus. Myers, D. 8:66.
Interpretation of Typhine morphology with special reference to Typhisala clarki. Gemmell, J. 11:88-93. 8 figs.
Minute Shells. [for individual titles in this series look under author] Hertz, J. 1:2-4, 3:26-28, 4:32-34, 5:41-42, 6:47, 8:63, 9:70-72, 10:82.
Muricids from Okinawa and the Bohol Straits. D'Attilio, A. 5:36-38, 6 figs.
Observations on the differences between the juvenile and mature Turritella anactor Berry, 1957. Hertz, C.M. 6:48-49. 3 figs.
Preliminary account of three generic taxa in the Muricacean family Coralliophilidae. D'Attilio, A. & H. Bertsch. 3:21-25. 6 figs.
Radwin & D'Attilio paper on Muricacean gastropods provides names for six species pictured in a previous FESTIVUS series. [Ed.] Hertz, C.M. 3:25.
Range extension for Isognomon janus Carpenter, 1857 (Bivalvia). Myers, B.W. &A. D'Attilio. 10:79-81. 2 figs.
Solemyidae: clarification of two species in the subgenus Petrasma. Gemmell, J., Myers, B.W., Hertz, C.M. 9:73-76. 5 figs.
The eastern Pacific Chromodorids Opisthobranchia: Chromodoridinae. Bertsch,H. 6:44-46. 1pl.
The eastern Pacific species of Murex sensu stricto. D'Attilio, A. & C.M. Hertz. 8:59-62. 6 figs.
The misidentified Buccinum chartium. Myers, B.W. & H. Bertsch. 7:56-57. 2 figs.
The naming of a new Caribbean volute, Scaphella contoyensis Emerson & Old, 1979. Everson, G. 5:39-40. 2 figs.
The San Carlos Rectangle. Poorman, F. & R. 4:30-31. 2 figs.
The sharp-tongued mollusks. Bradner, H. 2:9-15. 16 figs.
Tripterotyphis lowei from the Solomon Islands. D'Attilio, A. 7:51-53. 6figs.

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $4.50.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII January 1980 No. 1

PROGRAM: Clifford and Clifton Martin will present an illustrated talk on Shells of the Philippines.

Pictures from the September party will also be shown.

Date: Jan. 17, 1980 Time: 7:30 P.M. Room: 104

CONTENTS

Minute Shells HOMALOPOMA GRIPPII (Dall, 1911)
HERTZ, J..... 2

The Annual Christmas Party
SECKINGTON, S..... 5

TROPHON PAINEI (Dall, 1903): An Anomalous MUREX (Gastropoda, Muricidae, Trophoninae)
D'ATTILIO, A..... 6

SPONDYLUS PRINCEPS In Eduadorian Antiquity
SHASKY, D.R..... 9

DUES ARE DUE! SEND YOUR CHECK TO THE CLUB ADDRESS.

MINUTE SHELLS

HOMALOPOMA GRIPPII (DALL, 1911)

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Recently, I received a series of small shells from Loyal J. Bibbey. The material had been trawled by Ronnie Nichols in nets in depths of 300 to 450 feet on the south side of the La Jolla Trench (off San Diego, California) from January to June 1979.

Among the shells were 34 specimens of a rarely seen member of the Turbinidae, Homalopoma grippii (Dall, 1911). Keen (1971) placed this species in the subgenus Panocochlea Dall, 1908 which was originally proposed as a subgenus of Clanculus Montfort, 1810. Keen employed Panocochlea for a group of Homalopoma species occurring in moderately deep water in the Panamic province. The species range for for H. grippii is listed from Santa Rosa Island, California to Cape San Lucas and the Revillagigedo Islands, Mexico and is found in depths of 246 to 592 feet (75 to 180 meters). In the original description, Dall placed the species in the genus Leptothyra Dall, 1871, but this has been replaced by the earlier named genus Homalopoma Carpenter, 1864. The species was named for Mr. C.W. Gripp of San Diego, a fisherman who found two immature specimens on a stone hauled up on a fishing line from the rock-cod banks off the entrance to San Diego harbor in 600 to 900 feet.

Dall's original description (1911) based on these two immature specimens was thorough but was not accompanied by an illustration. In fact, the only published figure I could find was in Keen (1971). The original description follows. "Shell small, solid, of about five whorls; the apex slightly flattened, nepionic whorls one and a half, small, nearly smooth, whitish; sculpture on the spire on the second whorl three, increasing to five on the last whorl, strong, prominent, squarish spiral cords, articulated in the type with crimson and white, the interspaces at first smooth, on the later whorls with one to three intercalary much smaller spiral threads; on the last whorl between the peripheral cord and the next posterior cord five uniform fine threads, though this feature is probably variable; base flattened, translucent white, with one articulated crimson and white color band around the umbilical region, which is also white; pillar broad, white, with one prominent knob of callus in the middle of it; throat brilliantly pearly; the whorl is laid slightly above the peripheral cord, which is covered by the advancing whorl; body color crimson; faint spiral striae on the flattened base; axial sculpture only of incremental lines. Height of shell 5.25, of last whorl 4.0, max. diameter 6.0 mm. Operculum as usual in the genus, with about three whorls."

The 34 specimens trawled on the south side of the La Jolla Trench matched in almost all respects Dall's original description. The shells ranged in size from approximately 3.2 to 10 mm. in height and from approximately 4.0 to 9.0 mm. in maximum diameter. The majority of the shells are crimson in color, some are almost brown, one is pure white, and one is almost all white with a small amount of pink. The specimens have the flattened base, but not all of them have the articulated crimson and white color band. In some the band is absent, while in others the band is articulated brown and white. All of the specimens apparently were live when collected, since in most cases the operculum is visible. The sculpture too is quite variable with the cords varying from almost

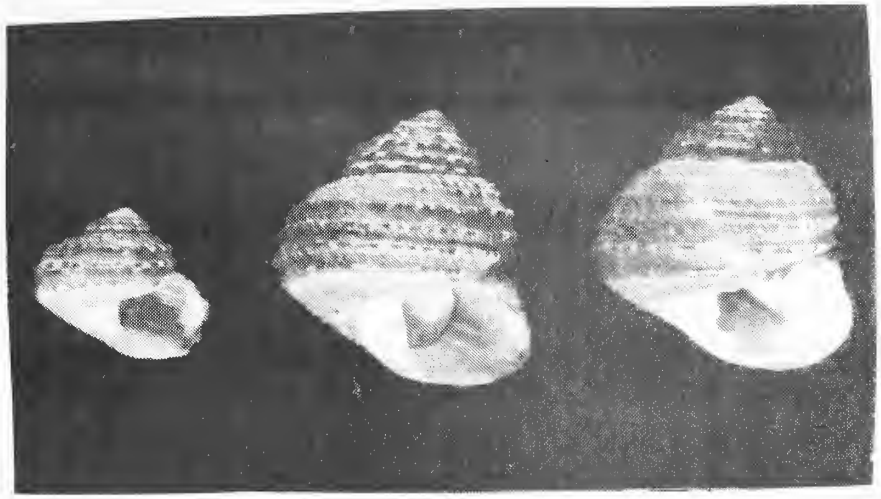


Fig. 1. Growth series of Homalopoma grippii Magnification of 3.6x.

smooth to coarse and prominent. Figure 1 is a growth series of H. grippii shown at an approximate magnification of 3.6x. The flattened base which is so characteristic of this species is readily apparent in the photograph. The color band around the umbilical region is barely visible on the left and center specimens. The prominent knob of callus on the pillar is easily seen. The strong, squarish articulated-color cords are also apparent in the left and center specimens. The right specimen has a rounder body whorl and was apparently damaged at one time. To the left of the break, the cords are spaced further apart and are relatively smooth. To the right of the break, we see closer spacing, more cords, and the cords are more prominent.

The trawled specimens were compared to the two lots of H. grippii in the San Diego Natural History Museum. The two lots (#29664 & #29669) were both obtained by H.N. Lowe in 1932 in 300 feet off Santa Catalina Island, California. Lot #29669 has one small specimen while lot #29664 had 25 specimens. All but two of the latter specimens were also quite small. There is a note with Lot #29669 indicating that it had been compared with the type in Washington, presumably by Lowe, and stating that it was "an exact match." There is no doubt that the 34 specimens trawled off the La Jolla Trench are the same species as those taken by Lowe off Santa Catalina Island.

The deep-water H. grippii is easily distinguished from the intertidal and shallow water species of Homalopoma found off Southern California. Of the shallow water species, it most closely resembles Homalopoma luridum (Dall, 1885). McLean (1978) pictures H. luridum, H. baculum, H. radiatum, and H. paucicostatum. He considers Homalopoma carpenteri (Pilsbry, 1888) as a synonym of H. luridum, and reports the range of H. luridum as Sitka, Alaska to San Geronimo Island, Baja California. Strong and Hanna (1930) report the range as Puget Sound to Peru. Burch (1946) distinguishes between H. carpenteri and H. luridum by the width of spaces between threads, i.e. the interspaces in H. carpenteri equal the threads in width while in H. luridum the interspaces are narrower than the threads. The range for both were listed as Puget Sound to Cape San Lucas. Not only are these species commonly found intertidally in Southern California but H. carpenteri has been reported as common in 150 feet off Redondo Beach with some taken as deep as 300 feet. It has also been reported dredged off Catalina Island in 210 feet.

Figures 2a and 2b are top and side views of H. luridum collected intertidally among and under rocks at the beach as the base of Archer Street, San Diego. It was one of a lot of 6 shells collected by me in March 1971. The shells were dark gray (although I have collected many color forms at other times). The shell is 5.7 mm. in diameter, and therefore the pictures are at an approximate magnification of 15x. Examination

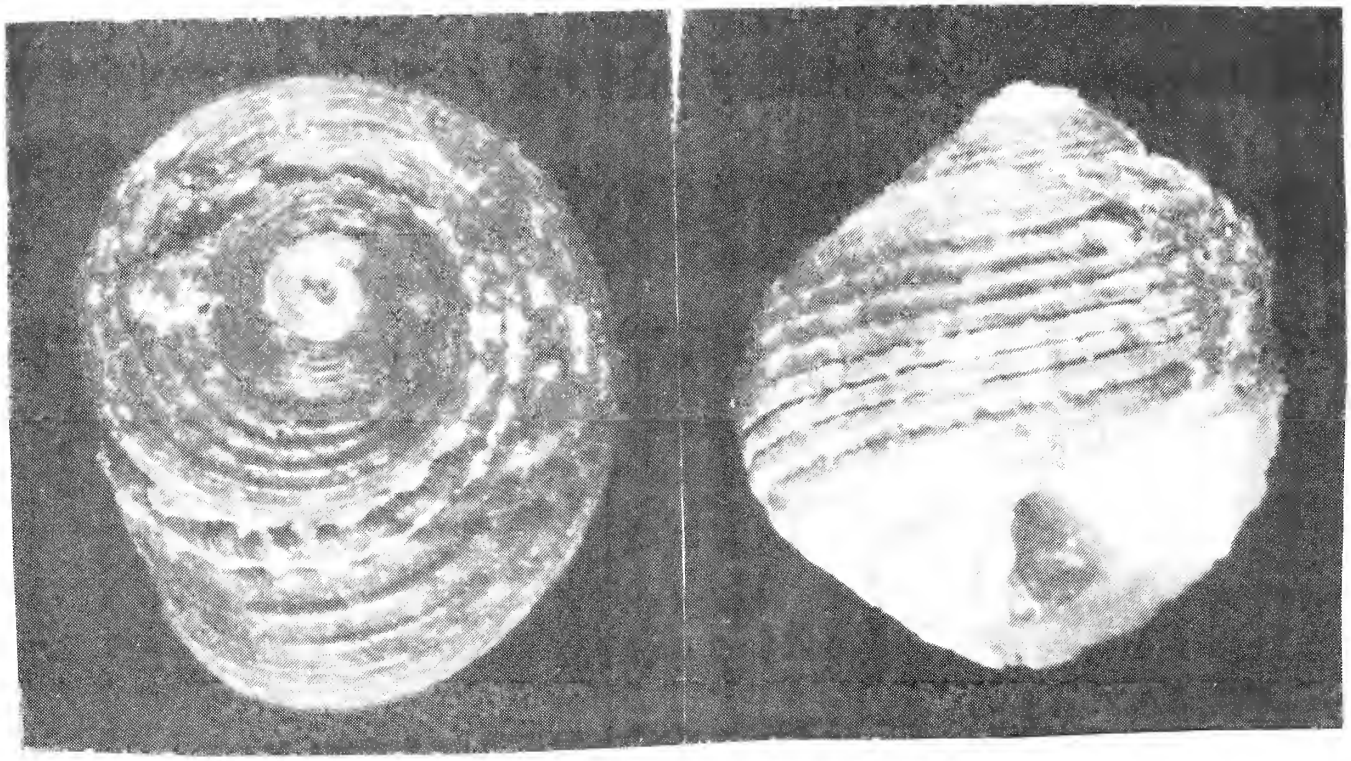


Fig. 2a. top view Fig. 2b. side view
H. luridum collected San Diego, California. Magnification 15x.

of the shell under magnification reveals that on the upper body whorl the interspaces between threads are about the same width as the threads. However, on the lower portion of the body whorl, the interspaces are much narrower than the threads.

Figures 3a and 3b are top and side views of another specimen.. I had collected this one on July 9, 1972 in Oak Bay, Vancouver Island, Canada.

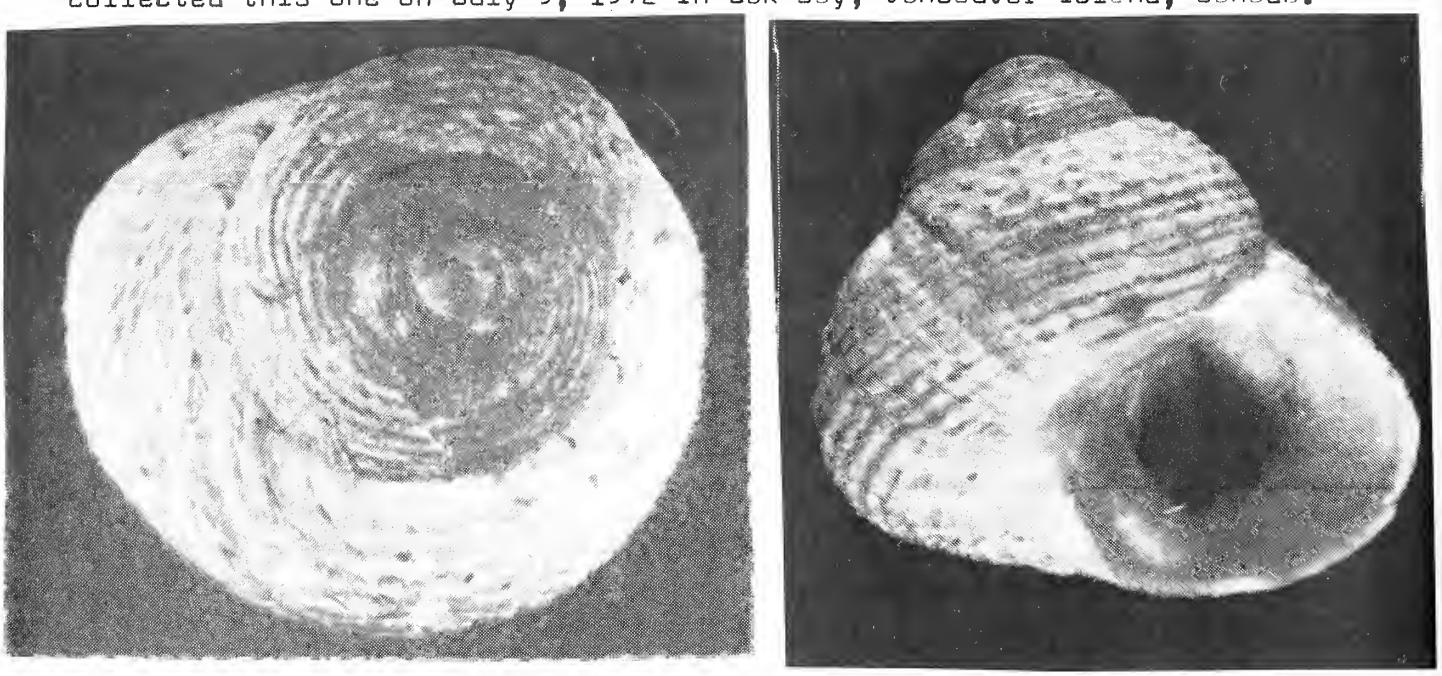


Fig. 3. top view Fig. 3b. side view
H. luridum collected Oak Bay, Vancouver Island, Canada
Approx. magnification 11x.

Originally, I believed this was H. carpenteri but close examination reveals the same type of spacing differences as noted earlier for the specimen collected in San Diego. In addition, there are differences in thread width on threads occurring on the lower portion of the body whorl. The specimen pictured in Figures 3a and 3b is white and has an approximate diameter of 7.9 mm. Based on these examinations, thread spacing doesn't appear to be a valid characteristic for differentiation of H. luridum and H. carpenteri. I now believe that the specimen shown in Figures 3a and 3b is H. luridum and that McLean is correct in regarding H. carpenteri as a synonym of H. luridum.

Examination of the photographs of Figures 1 to 3 readily shows the differences between H. grippii and H. luridum. The H. luridum is a globose shell with rounded spiral cords, whereas the H. grippii has the flattened base, squarish spiral cords, and fine spiral striae on the body whorl as well as on the flattened base.

The author is indebted to Loyal J. Bibbey for the lot of H. grippii, and to David K. Mulliner, FESTIVUS staff photographer, for the excellent photographs of the specimens of Homalopoma.

Literature Cited

Burch, J.Q., ed. 1946. Distributional list of the West American marine Mollusca from San Diego, California, to the Polar Sea (extracts from the) Minutes of the Conchological Club of S. Calif., Pt. II. Vol. II(57):20-21. (Feb.).

Dall, W.H. 1911. A new Leptothyra from California. The Nautilus. Vol. XXV (3):25-26. (July).

Keen, A. Myra. 1971. Sea shells of tropical West America. Stanford Univ. Press. 1064 pp. (pp. 350-351).

McLean, J.H. 1978. Marine shells of Southern California. L.A.C.M. (N.H.) Sci. Ser. 24. Revised Ed. Zoology (11). 104 pp. 54 figs. (Mar. 20).

Strong, A.M. and G.D. Hanna. 1930. Marine Mollusca of the Revillagigedo Islands, Mexico. Proc. Cal. Acad. Sci., Ser. 4. Vol. 19(2):7-12. (June 4).

THE ANNUAL CHRISTMAS PARTY

SANDIE SECKINGTON

Members attending our Christmas party at the Cafe Del Rey Moro began the holiday season in the best, most festive way. Our congenial group toasted each other, absent members, and the season, and once again thoroughly enjoyed the Madison High Honor Ensemble who sang most beautifully for us after dinner.

Officers for the new year were installed and toasted. They are Sandie Seckington, President; Dave Mulliner, Vice President; Carol Burchard, Recording Secretary; Marge Bradner, Corresponding Secretary; and Wally Robertson, Treasurer. Carole Hertz, who will continue as Editor of The FESTIVUS, was applauded heartily for another year of quality publications.

The shell gift exchange drew many delighted exclamations as some really lovely specimens found appreciative new homes.

As has become our tradition, the evening concluded with us all around the piano singing holiday favorites with great spirit and fervor.

TROPHON PAINEI (DALL, 1903): AN ANOMALOUS MUREX (GASTROPODA, MURICIDAE, TROPHONINAE)

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California, 92112

In this paper Murex (?Ocenebra) painei Dall, 1903 is assigned to the Trophoninae as Trophon painei (Dall, 1903). Illustrative material and other data are provided to substantiate this generic placement.

The recent finding of a muricid species referable to Murex (?Ocenebra) painei from off San Diego, California has again posed an interesting taxonomic problem. The original description by Dall was not accompanied by an illustration of the new species. This omission was rectified in U.S.N.M. Bulletin 112 (Dall, 1921) on which occasion Dall substituted the taxon Tritonalia painei. The illustration, a steel engraving, shows a small shell which in Dall's words "resembles one of the Austral Trophons in miniature." The questionable allocation of 1903 and the subsequent citation of the species as Tritonalia (=Ocenebra) seems to indicate that the possession of a fused canal was the deciding factor in Dall's generic allocation, in spite of the otherwise admitted Trophoninae characters.

The fused canal, it is true, is much in evidence in a number of Californian species of Ocenebra but this character is not entirely a reliable indicator of subfamily placement. More consistent indicators, for subfamily placement, are the operculum and the radula. The operculum of Trophoninae species is more typically that of Muricinae because of the position of the nucleus on the operculum. The operculum of Ocenebrinae species differs by not having a nucleus. In addition, the radula of Ocenebrinae species does not have a typically Muricinae-Trophoninae character, i.e. a rachidian plate with five denticles, a central, 2 smaller laterals, and 2 intermediate still smaller denticles. The radula of Ocenebrinae has, as a rule, a series of strong folds ending in small denticles on both sides of the lateral denticles on the rachidian plate and, in addition, the intermediate denticles are appended to the laterals, and the central cusp or denticle very strongly arches forward ahead of the far sides. The radula of Trophoninae species is closely allied to Muricinae.

T. painei (Fig. 1) is known thus far from only a few records in the literature. Material studied by me is from San Diego north to Catalina Island. All collected specimens were obtained in about 80 to 100 meters by trawling. The pictured specimen was taken during codfish trawling operations in 1979 by Mr. Ronnie Nichols in nets from 300 to 450 feet on the south side of the La Jolla Trench. The holotype was collected off Catalina Island in the Santa Barbara Channel. Records of collecting depths for Ocenebrinae species indicate that the species of this subfamily are found from the intertidal to depths of approximately 25 meters. Trophon species occur mostly in relatively deeper or colder waters. This deeper water habitat probably accounts for the relative scarcity of Trophon species in private or museum collections.

In Radwin and D'Attilio, 1976, T. painei is referred to Ocenebra with a question mark and with the following comment, "the lamellose sculpture, stout form suggests affinity with the southern trophons (e.g. T. geversianus Pallas, 1774); the fused canal implies an ocenebrine

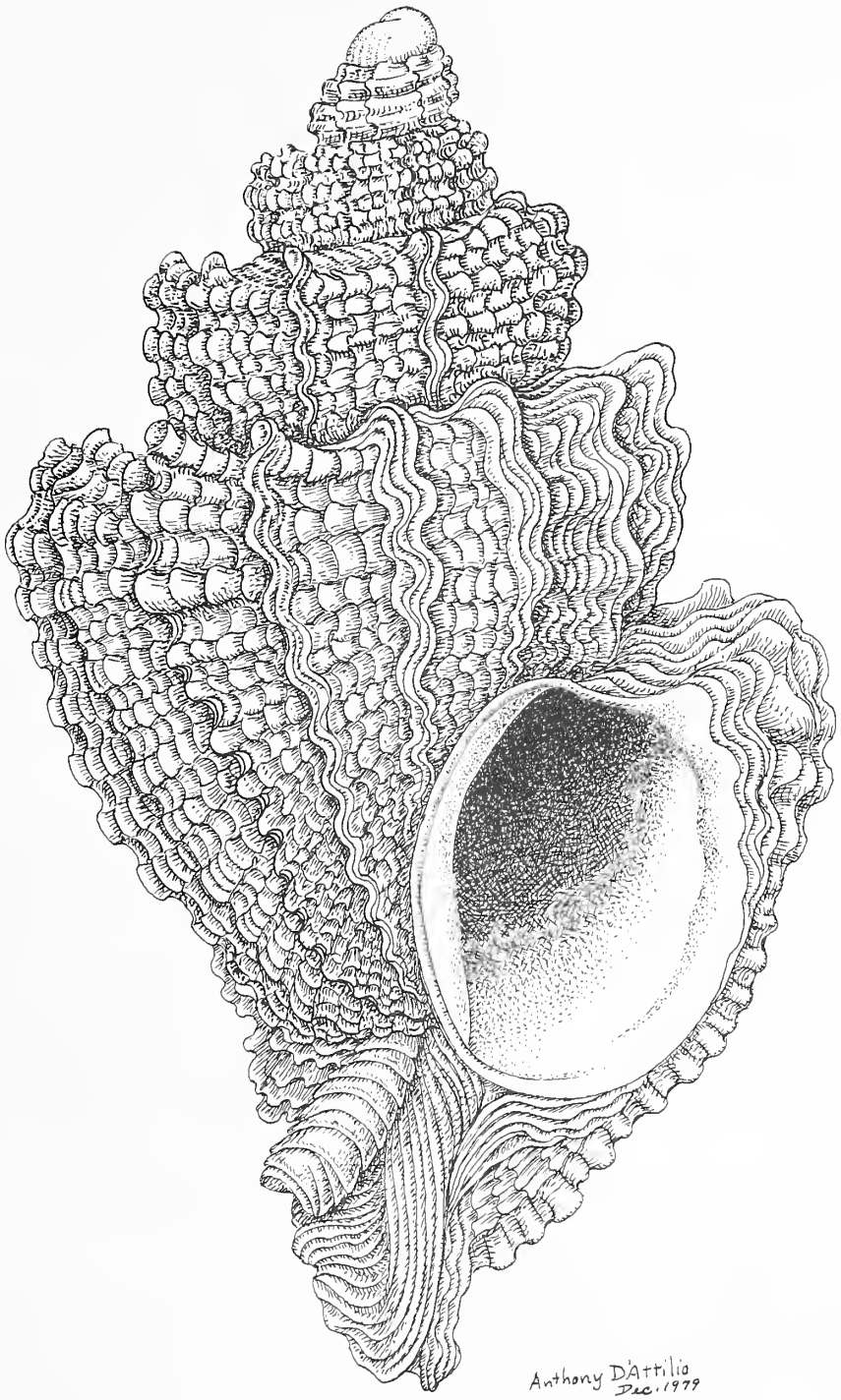


Fig. 1. TROPHON PAINEI (DALL, 1903)

relationship; and the radula favors neither of these possibilities. Thus the species is placed here conditionally." While engaged in preparation of the Murex book a radula study of T. painei was undertaken. The specimen studied is in the Los Angeles County Museum (N.H.), A.H.F. 1240-41 and is in that collection presently.

The figure of this radula (Fig. 2) has not been previously published. I am strongly impressed with its close generic relationship to those of a number of other Trophon species that I have studied especially that of Trophon geversianus (Pallas, 1774), the type of that genus. The radula of T. geversianus was illustrated by Thiele, 1929.

The operculum (Fig. 3), the protoconch (Fig. 4), and the shell of T. painei (Fig. 1) are illustrated herein as camera lucida drawings done with a microscope.

The closed canal of T. painei requires comment since this character is not otherwise associated with Trophoninae. Although a closed canal is associated with many Ocenebrinae genera it is not consistent and in some genera Roperia, Urosalpinx and Eupleura the canal remains open. I consider, therefore, that the closed canal is an aberrant feature for a species which otherwise surely has Trophon characters.

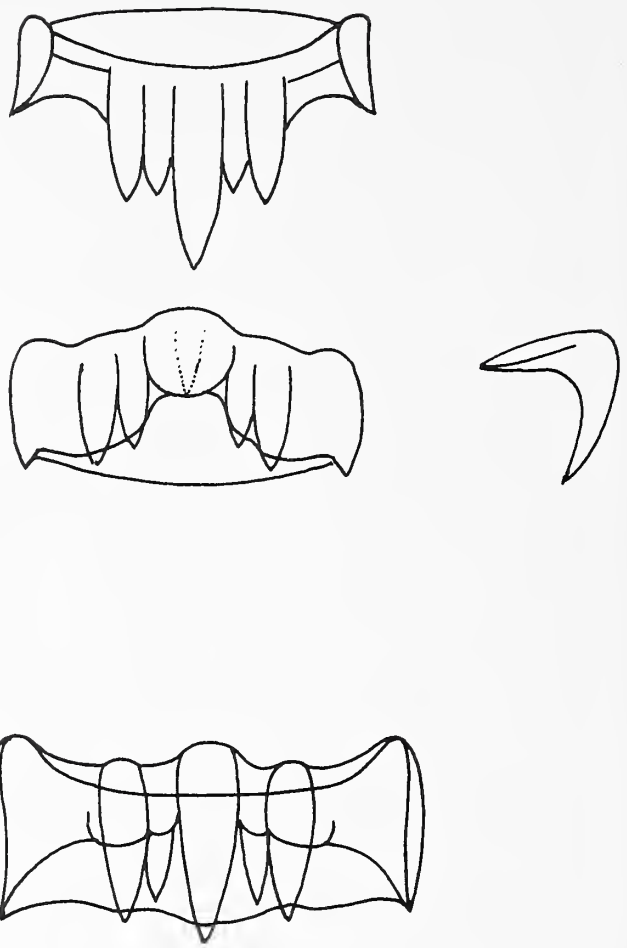


Fig. 2. "Murex" painei Dall, 1903
9 miles off San Diego, Calif.
78-81 fms. A.H.F.- L.A.C.M. 1240-41

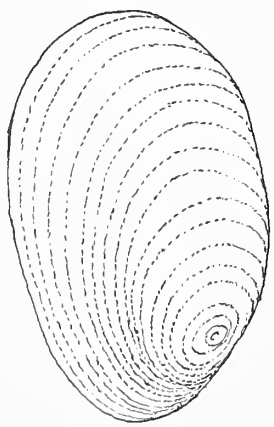


Fig. 3. Operculum of T. painei

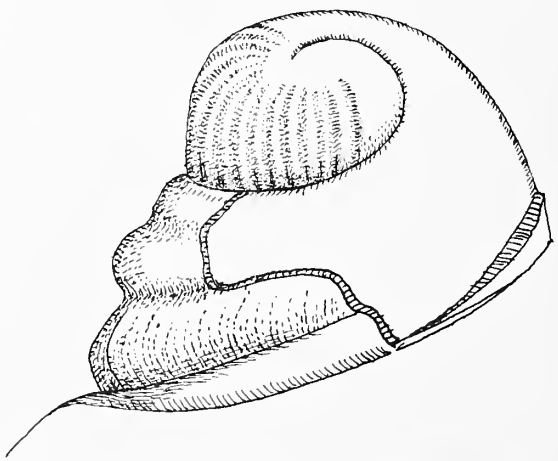


Fig. 4. Protoconch of T. painei

Acknowledgements

I am indebted to Mr. L.J. Bibbey of Imperial Beach, California, for the gift of the figured specimen now in the collection of the S.D.N.H.M. Also I wish to extend my thanks to Mrs. Barbara W. Myers, department assistant, for identifying the specimen and then prompting me to undertake this paper and Dr. Hans Bertsch for his valuable comments on the text.

Literature Cited

Dall, W.H. 1903. Diagnoses of new species of mollusks from the Santa Barbara Channel. Proc. Biol.,Soc. of Wash. Vol. 6:171-176.

1921. Summary of the marine shell bearing mollusks of the northwest coast of America from San Diego, California, to the Polar Sea, mostly contained in the collection of the U.S.N.M., with illustrations of hitherto unfigured species. U.S.N.M. Bull. 112. 217 pp. 22 pls.

Pallas, P.S. 1774. Spic. Zool. X. p. 33.

Radwin, G.E. and A. D'Attilio. 1976. Murex shells of the world, an illustrated guide to the Muricidae. 284 pp. 30 pls., 192 figs.

Thiele, J. 1929. Handbook der systematischen weichtierkunde. Vol. 1. 778 pp., 783 figs.

SPONDYLUS PRINCEPS IN ECUADORIAN ANTIQUITY

DONALD R. SHASKY

229 Cajon Street
Redlands, California 92373

[From a paper presented at AMU-WSM--1979]

Before I discuss Spondylus princeps, I want to briefly mention the organization sponsoring the work in Ecuador. I first became acquainted with the Program for New World Anthropology, an Ecuadorian organization, through Earthwatch. The founder of the Program for New World Anthropology is Presley Norton, an Ecuadorian of American heritage. His chief collaborator is Dr. Jorge Marcos, anthropologist-archaeologist from Guayaquil.

Last summer was the first year of archaeological exploration for the Program for New World Anthropology. Excavation was limited to La Plata Island. This year, in addition to continuing the excavation of sites on La Plata Island, several dozen new sites have been surveyed on La Plata and many sites on the adjacent mainland have also been staked off.

I was asked to work as a full-time SCUBA diver. My principal assignment was to try to find Spondylus princeps and secondarily, to do a malacological survey of the island. Last September, [1978] I spent one week on La Plata and one week diving at Salango Island and Punta Mala. In June of this year, I spent three weeks on La Plata. How many seasons it will take for me to complete my part of the project I cannot say, but I do expect to return next summer.

A brief word about why the island is called, "La Plata." Plata is the Spanish word for silver. In late 1578, Sir Francis Drake was plundering the coasts of Chile and Peru on the Golden Hind. The ship was so heavily laden with silver and gold that by the time he reached Ecuador, Spanish galleons were closing in on him. He anchored in a cove on the lee side of the island and dumped 60 tons of silver in 60 feet of water. He did not appreciate how precipitous a slope the bottom has so that when he returned later, he was unable to find any trace of the silver. (The lodge where we stay on La Plata is on this cove). During the late 1920's, the British recovered about 20 tons of Drake's silver. There is another 40 tons waiting to be discovered. I haven't found any of it yet!

In 1833 in the Proceedings of the Zoological Society of London, Broderip described Spondylus princeps and the type locality was La Plata Island. It was collected by Hugh Cuming in 1829, and was taken in a depth of 17 fathoms. Although Spondylus princeps was new to Cuming, Broderip, and the scientific community; it had been well known to the Indians of Ecuador, Peru, Bolivia, Chile, Meso-America, and Mexico for several millenia. To the Indian, the Spondylus was known as "mullu." Its value on a weight basis was higher than that of gold and at the time of European contact, possession of just one of these Spondylus automatically made the owner rich.

There are three main archeological periods of the Guayas basin and the Manabi coast. The Valdivia ranging from approximately 3500 B.C. to 1100 B.C. I shall refer to as Period A. The second period ranging from 1100 B.C. to 100 B.C. is the Chorrera, which will be referred to as Period B. The third and latest period is the Manteno which ranges from 100 B.C. to 1532 A.D. This will be referred to as Period C.

During Period A, the coastal Ecuadorian Indians made little use of Spondylus for themselves. It appears to have been used as a trade item and of little ritual value to themselves. By Period B, they were making more use of the Spondylus as beads, pendants, masks, and ear spools. But generally this was from the white center of the shell. Early in Period C, it becomes apparent that the coastal Indians began to place an increasing value on objects made for themselves from the red rim of Spondylus. In contrast to the coastal Indians, the Andean Indians were coveting items made from the red rim as early as Period A. By Period C, with both the Andean Indians and the coastal Indians placing an increasing value on items made from the red rim, millions of Spondylus shells were being collected to supply this great demand. Early Spanish explorers along this coast found Indians in huge canoes laden with Spondylus shells.

So far, excavation on La Plata Island from two sites just off the beach, shows civilizations going well back into Period B. Artifacts from Period A Indians have not yet been identified. Since both Mr. Norton and Dr. Marcos believe that La Plata Island was a sacred ceremonial site, it is hoped that Period A, or Valdivia sites, will be found when excavation is commenced on the top of the island.

When I first arrived at La Plata in early September of last year, [1978] the previous group, working in August, had already uncovered a large cache of Spondylus from Period C. This cache had been unworked and for some reason had been abandoned. Thousands of beads in various sizes and shapes from the red rim of the Spondylus were obtained in the siftings from the excavated soil. One exciting find was a royal Inca pot which established that there had been some communication with the Andean Indians and the Indians on La Plata. Also found in the excavations both last year and this year were both stone and coral weights and many fish hooks made from the pearl oyster, Pinctada mazatlanica. The most exciting find this year was a pitcher from early Period B which Dr. Marcos dated as approximately 1000 B.C.

Although I went with a ¼ inch Farmer John wet suit, I was ill-prepared for the water temperatures that we found last September. Although the depth of the thermocline varied from day to day, we would experience, someplace between 70 and 110 feet, an instand drop in temperature to 48 degrees. This, of course, meant an instant numbness that made diving most uncomfortable.

It was not until the fifth day of diving that I found my first Spondylus princeps. Since my time on the island was growing short, I had decided to give it an all out try. I had never previously dived below 120 feet, for at that depth I undergo rather severe nitrogen narcosis. We had passed through the 48 degree barrier at 70 feet on that dive. At 120 feet, I immediately began to feel the effects of nitrogen narcosis, but I continued on down to 135 feet where I immediately saw some dark round objects that were heavily encrusted. Because of dizziness I was not focusing well, but I did grab two of these objects and put them into my collecting bag. I signaled to the dive master who was with me that I thought I had found what we were looking for, but in the same motion I signaled to him that I was drunk and that I was going up. He also picked up one of these but when he saw how bad off I was, he dropped it and accompanied me to 60 feet. At 60 feet my mind cleared and after a few moments decompression, I went on up to the boat. As soon as we reached shore, word spread quickly that we thought that we had found the Spondylus princeps and all archaeological activity ceased as people huddled around to see what we had. Sure enough, we had two Spondylus princeps.

All totaled, I found three additional specimens on my last day there; one at 110 feet and two at 68 feet. One of the other divers collected one specimen. This year,we found eight additional specimens at depths between 85 and 110 feet --certainly not very impressive.

Finally I wish to raise the question, "How did the ancient Indians obtain the millions of specimens that they used?" Until now it has been felt that divers collected these and I would not deny that as a possibility; but I think it is extremely unlikely. To repeatedly free dive to the depths in which this species is found, taking enough time to locate them, and then to ascend with them or to fill some kind of a container seems almost impossible to me. Since there is wild cotton on the island and since there were both rock and coral weights found in the excavations, it leads me to believe that these shells were trawled.

To further my argument, just last week I came across a reference in Sir Edward Belcher's narrative of his Voyage Around the World aboard the Sulfur in which he records watching expert pearl divers in Panama. He stated that their average bottom time at 5 to 6 fathoms (30 to 36 feet) was only 40 to 42 seconds. When a reward was offered to the man who could stay underwater the longest, he was able to stay 96 seconds at 7 fathoms (42 feet). Belcher states "from what we witnessed of his exhaustion and the reports of others who repute him their best diver, I am strongly inclined to doubt the suspension of breathing, with power of exertion, for a longer period." I am aware of much deeper free dives made by modern highly skilled athletes. My oldest son, who teaches SCUBA diving at the University of Puerto Rico tells me of free dives made to 300 feet with mask, fins, snorkel and wet suit. Without such equipment, and without any professional training, I do not believe the Indians collected Spondylus by free diving.

[redacted]
[redacted]
3[redacted] MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO
JAN 10
PM
1980

Smithsonian Institution
Library-Acquisitions
[redacted]
Washington, D.C. 20560

THIRD CLASS MAIL
RETURN POSTAGE GUARANTEED

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $4.50.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII February 1980 No. 2

PROGRAM: James Stewart, Diving Officer at Scripps Institution of Oceanography, will give an illustrated talk entitled, "A Diver's Diverse Observations."

Pictures of the September Party will also be shown.

Date: Feb. 21, 1980 Time: 7:30 P.M. Room: 104

CONTENTS

Club News..... 13

Comments on species of Homalocantha (Gastropoda: Muricidae)
D'ATTILIO, ANTHONY and HANS BERTSCH..... 14

A Reef Report
POORMAN, FORREST 21

Library Notes: Review of SEA SHELLS OF WESTERN EUROPE
MYERS, BARBARA W. 21

DUES ARE DUE BY JANUARY 1 AND ARE DELINQUENT BY APRIL 1. Please send dues to the Club address or to Walter Robertson, Treasurer, by March 24 so you will be included on the 1980 Club membership roster.

SPECIAL ISSUE IN MARCH

The March issue of The FESTIVUS will feature the article, Seastar predation on mollusks in the waters in and surrounding San Felipe Bay, Baja California, Mexico, by Joyce Gemmell, Carole M. Hertz and Barbara W. Myers. The paper will feature an annotated list of over 80 species of mollusks taken from seastar stomachs with more than 40 photographs and drawings.

As a service, The FESTIVUS will make copies available to non-members and/or additional copies to members at $3.00 per copy ($3.50 overseas).

FROM THE MINUTES - JANUARY 17, 1980

CAROL BURCHARD

President Sandie Seckington called the meeting to order at 7:45 P.M. New members and guests were introduced.

Hugh Bradner introduced Clifford and Clifton Martin who presented a most interesting program on the Philippines. Note was made that the recent use of the tangle nets has brought up shell species off Cebu and neighboring islands which were previously unknown or rarely found in the region. Their slides of the area and of many of the species found were outstanding. (FESTIVUS article to follow. Ed.)

The following announcements were made.

The Shell Club needs volunteers to fill positions as Telephone Chairman and Botanical Garden Foundation Representative. Interested persons please contact Sandie Seckington (462-9455).

Dues are due by January 1 and are delinquent by April 1. Please send dues to the Club address or to Walter Robertson, Treasurer, by March 24 so you will be included on the 1980 Club roster..

The Western Society of Malacologists will hold their meeting this year at UC Davis from June 22-25. For further information contact Kay Webb, Treasurer at 501-A Anita St., Space 186, Chula Vista , Ca. 92011

Fred Closson was the winner of the shell drawing. The meeting was adjourned at 9:10 P.M.

SAVE THE DATE: The Club's annual Auction/Potluck will be held on Saturday evening, April 26 , 1980 at the home of Marge and Hugh Bradner. Details in the next issue. It is not too soon to choose the shells for your donation to the auction. Bring your quality shells with as much data as possible to the February or March meeting. If this is not possible, arrange with a Board member for pickup of your donation.

The VELIGER, Volumes 10 through 16 (July 1967 - April 1974) available. For further information contact Roland and Kay Taylor at 274-2998.

COMMENTS ON SPECIES OF *HOMALOCANTHA* (GASTROPODA: MURICIDAE)

ANTHONY D'ATTILIO and HANS BERTSCH

Department of Marine Invertebrates, San Diego Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112, USA

The Philippine Islands have long been known as a rich source of mollusks. For over 2 centuries, local fishermen have supplemented their income by selling shells to collectors around the world. Today there is a thriving industry of shell dealers in the Philippines, sending out boats to dredge specifically for shells. No longer just ancillary to fishing, shell collecting in the Philippine Islands has its own raison d'etre. In this way, several United States collectors have recently obtained specimens of the distinctive species, *Homalocantha anomaliae* Kosuge, 1979. This species shows morphological features characteristic of the genus, but differs greatly from previously named *Homalocantha*. After examining several specimens of this unique species, we feel that further morphological information will be useful in understanding the genus. Hence in this paper we give a more detailed description of *Homalocantha anomaliae*, plus comparisons of this species with its known congeners.

Muricidae Rafinesque, 1815
Muricinae Rafinesque, 1815
Homalocantha Mörch, 1852

Types species, *Murex scorpio* Linnaeus, 1758, by monotypy.

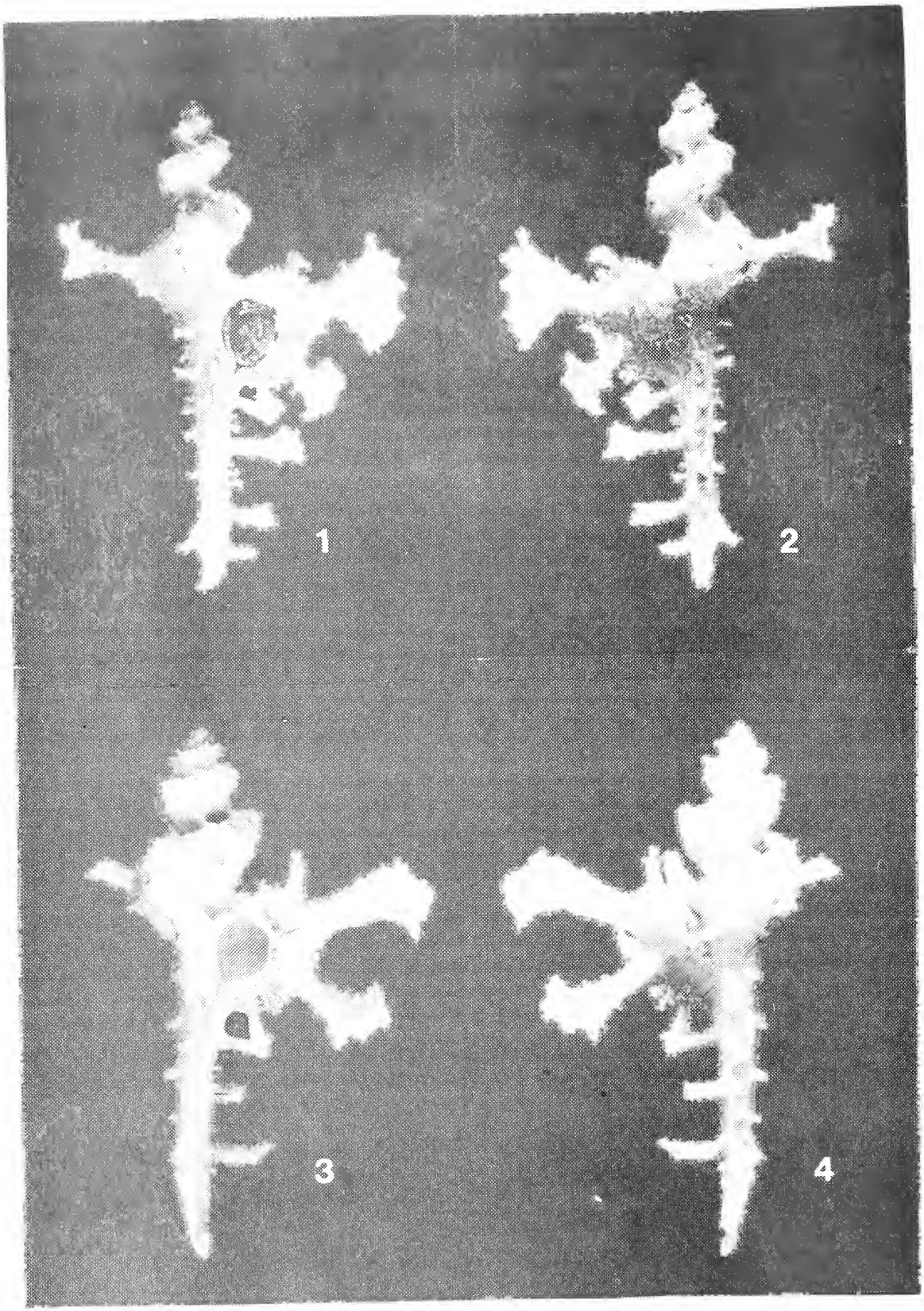
Homalocantha anomaliae Kosuge, 1979

Material examined: Two specimens. San Diego Natural History Museum, Department of Marine Invertebrates, the shell is 50 mm long (Fig. 1 and 2). Collection of Mr. Gene Everson, 52.5 mm long shell (Fig. 3 and 4). Both specimens were dredged (from possibly 60-100 m deep) in the Bohol Straits, Philippine Islands (approximately 10° N; 124° E), between the islands of Cebu and Bohol.

Description: The shell is approximately 50 mm in height, fusoid and much attenuated; protoconch not preserved; spire high, somewhat loosely coiled, shouldered with a deep embayment set well below the shoulder; the suture is weakly indicated at bottom of embayment. The body is of moderate size relative to the high spire and lengthy canal. The aperture is almost circular, lacking an anal trough. The outer lip is undulate and weakly crenulate. It is marked with 3 brown areas in the convex portion between the larger crenulations; smaller brown indications are on the lip posteriorly; the inner lip is simple and slightly erect. Canal is long, straight, barely open, strongly recurved terminally, about the same width along its entire length.

Axial sculpture consists of 4 varices on the body whorl and 5 on the spire. The varices cross the shoulder diagonally and continue to the following shoulder, forming a narrow bridge or buttress over the shoulder embayment. The brown markings on the outer apertural lip are present on the forward edge of the varices of the spire as a series of pits whether the spines are present or lacking.

Intervarical areas are smooth, but on the varices there are spines extending from the varical margin. A large dominant spine is situated at the shoulder of each varix; a secondary spine below is present only on the apertural varix. The larger spines extend outward and terminate in a broad



Text figures 1-4.
1 and 2. Homalocantha anomaliae Kosuge, 1979, 50 mm long.
3 and 4. Homalocantha anomaliae Kosuge, 1979, 52.5 mm long.

wavy lobe, fringed with 4 or 5 short crenulations. The surface of the spines is covered crosswise with coarse, weakly raised lamellae.

Between the major spines at the apertural varix there is a strong connecting web extending from above the shoulder to the base of the body whorl. The web is scabrously laminate on its ventral side, and terminal scales are present along its entire margin.

Some 3 or 4 major spines are on the most recently formed side of the siphonal canal, with interspersing spinelets (0-3) between them. The basal remains of spines and the spinelets are found on the 3 close-set varical ridges (appearing as lengthwise rows) that are present on the outer surface of the siphonal tube.

Color of shell is deep flesh (richest on the body whorl), shading into creamy white on the palmate terminations of the spines; color of aperture is pale flesh.

Operculum (Fig. 13) has the nucleus off center, and it is entirely ridged with fine concentric lines.

There are several statements in Kosuge's (1979: 2) original description of Homalocantha anomaliae which need clarification. The large size of the body whorl (70% of the entire shell) is accounted for by including the siphonal canal in the measurements. Contrary to a "barely discernible anal sulcus" we found this feature totally lacking in the specimens available to us. The phrase "outer varical lip is erect and finely dentate" does not imply that there are denticles within the lip. The outer edge is better described as mainly smooth and only weakly crenulate. The sentences containing "a ventrally fine fimbriate webbing connects an uppermost small spine..." and "...all the spines on the body" should be modified to indicate that a varical flange connects the 2 major spines and the spinelets of the body whorl; the ventral surface of this flange is covered with fine fimbriate webbing (one can also say, with coarse, weakly raised lamellae, or that it is scabrously laminate). Shell color is variable--creamy white or deep flesh; the small brown maculations were visible on all specimens seen by us. We have seen a third specimen, 69 mm long, on display at the Conchologist of America meeting, October 1979, in Santa Monica, California. To date, this species has been collected only from deep water in the Philippine Islands.

The origin of specimens labelled Homalocantha scorpio in nineteenth century conchological illustrations is apparently unknown. The modern forms of H. scorpio are collected in the Philippines and have a more robust, stockier shape. Neither of these variations of H. scorpio are to be confused with, or identified as, H. anomaliae.

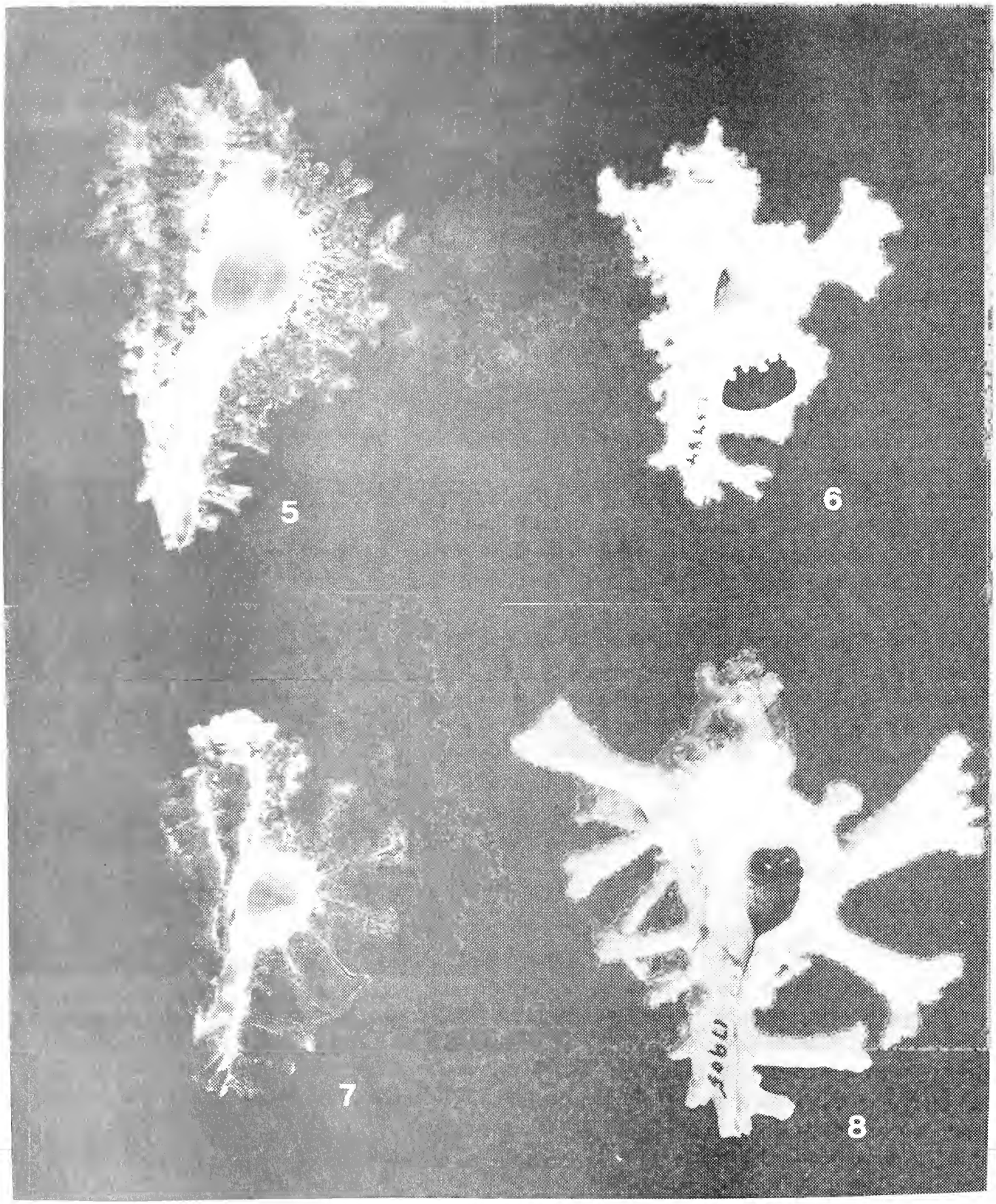
Discussion

In recent years there has been some disagreement regarding the numbers of species referable to Homalocantha. A cursory survey of two recent compendiums shows 11 species (Fair, 1976) or 7 species (Radwin & D'Attilio, 1976). The previously known species have an erratic history of being considered full species, subspecies, or synonyms. Including the new species, Homalocantha anomaliae, we recognize 11 species of Homalocantha (and one species inquirenda) which fall into 2 distinct groups:

With palmately digitate shell projections

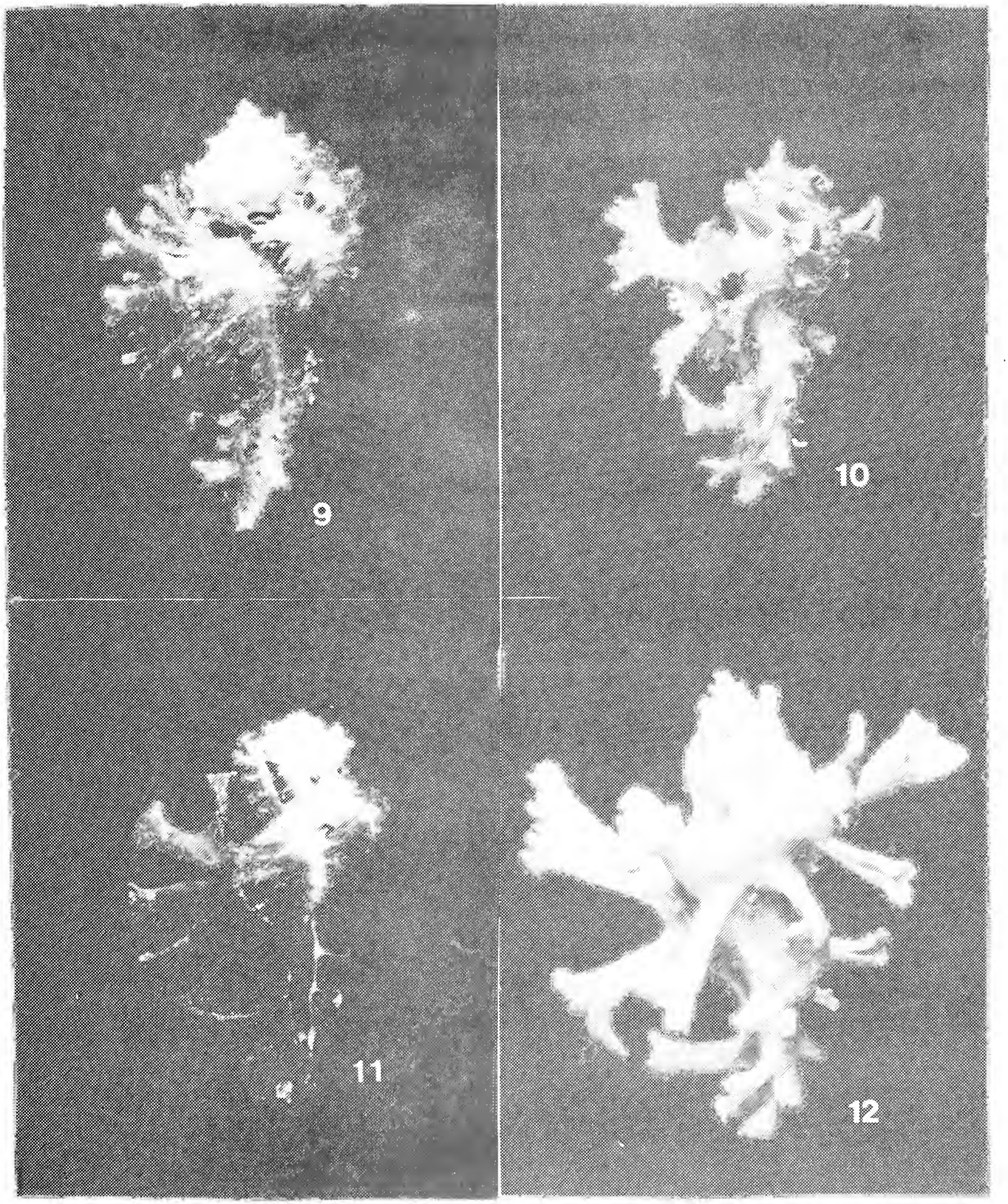
Indo-Pacific localities

Homalocantha anatomica (Perry, 1811)
Homalocantha anomaliae Kosuge, 1979
Homalocantha digitata (Sowerby, 1841)
?Homalocantha fauroti Jousseaume, 1888
Homalocantha lamberti (Poirier, 1883)
Homalocantha pele (Pilsbry, 1918)



Text figures 5-8. Apertural views of four species of Homalocantha, for comparison with H. anomaliae.

5. H. digitata, 54 mm long; near Dissei Is., Dahlak Archipelago, Red Sea, Jan. 1973, by R. & D. Janowsky; Rose D'Attilio collection.
6. H. pele, 41 mm long; at Tanabe, Kii, Japan by T. Kuroda; SDNHM 23984.
7. H. scorpio, 43 mm long; Bohol Prov., Philippine Is.; SDNHM 50825.
8. H. zamboi, 53 mm long; trawled Cebu, Philippine Is.; SDNHM 17905.



Text figures 9-12. Dorsal view of four species of Homalocantha, for comparison with H. anomaliae.

9. H. digitata, 54 mm long; near Dissei Is., Dahlak Archipelago, Red Sea, Jan. 1973, by R. & D. Janowsky; Rose D'Attilio collection.
10. H. pele, 41 mm long; at Tanabe, Kii, Japan by T. Kuroda; SDNHM 23984.
11. H. scorpio, 43 mm long; Bohol Prov., Philippine Isl; SDNHM 50825.
12. H. zamboi, 53 mm long; trawled Cebu, Philippine Is.; SDNHM 17905.

Homalocantha scorpio (Linnaeus, 1758) (type species by monotypy)
Homalocantha secunda (Lamarck, 1822)
Homalocantha zamboi (Burch & Burch, 1960)

Without palmately digitate shell projections
Eastern Pacific localities

Homalocantha oxyacantha (Broderip, 1833)
Homalocantha tortua (Sowerby, 1834)

Eastern Atlantic localities

Homalocantha melanamathos (Gmelin, 1791)

The genus *Homalocantha* typically includes species with palmately digitate shell projections. Species with nonpalmate spines are congeneric because of shared radular and opercular morphologies. The rachidian tooth has a strong, thickened central cusp; the cusps are uniquely blunt, squat, and shortened; and each intermediate cusp is reduced so greatly that it appears to be a small lump along side of the cusp. Radwin & D'Attilio (1976: Fig. 29) illustrate the teeth of *Homalocantha scorpio*; Cernohorsky's illustration (1967: Fig. 11) of *H. anatomica* does not indicate the presence of intermediate denticles. For comparison, we illustrate the radulae of the palmately spined *H. secunda* (Fig. 14) and the non-palmate species, *H. oxyacantha* (Fig. 15). The operculum of *Homalocantha* species appears ocenebrine in form.

Fig. 13. Operculum of *Homalocantha anomaliae*, 50 mm long specimen.

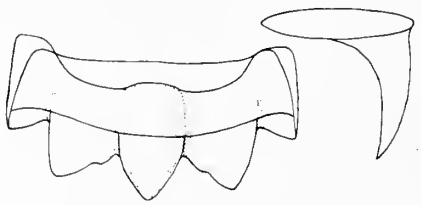


Fig. 14. Radula of *Homalocantha secunda*, from a specimen collected at Broome, N.W. Australia.

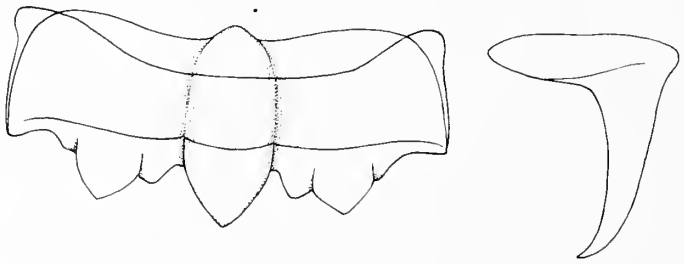


Fig. 15. Radula of *Homalocantha oxyacantha*, from a specimen collected at Bahia Coastocomate, Jalisco, Mexico

Homalocantha anomaliae needs to be compared only with the other Indo-Pacific species. They share the characteristic palmate-shaped spines. This new species may be distinguished readily from other Indo-Pacific species by its comparatively attenuated, elongate form, the extended spire (each complete turn of the whorl is separated from the earlier whorl by

about ½ the diameter of the coiling), the unusual length of the siphonal canal, and the brown maculations at the varical margins and aperture. This suite of traits is unique to Homalocantha anomaliae, and does not exist in any of the other known species of Homalocantha.

In general form, Homalocantha anomaliae has a smoother appearance than all its other congenerics except H. zamboi. Homalocantha anomaliae lacks prominent spiral ribbing of H. digitata (Fig. 5 and 9), H. fauroti, H. lamberti, H. scorpio (Fig. 7 and 11), and H. secunda. The distinctly spaced spines, a slightly scabrous sculpture, and a slight shoulder (a rounded keel) on the whorl are the only ornamentation immediately visible on the shell of H. anomaliae.

Homalocantha anatomica (from the Indian Ocean) and H. pele (the western Pacific, from Japan to Hawaii) (see Vokes, 1978: 410, for the identifying characteristics of these 2 species) have a broader, heavier shell, with a more compressed spire, larger aperture, and relatively larger body whorl.

Homalocantha pele (Fig. 6 and 10) is variably colored white, flesh, violet, coral red and rarely yellow. Neither H. pele nor H. anatomica possess the brown varical spotting unique to H. anomaliae.

Homalocantha zamboi, H. anatomica and H. pele have an accessory row of spines basally in front of the main varical spines which H. anomaliae lacks. The spire of H. zamboi (Fig. 8 and 12) is proportionately smaller, and the aperture is proportionately larger in comparison with H. anomaliae. The almost complete separation of each whorl is also unique to H. anomaliae.

ACKNOWLEDGMENTS

We thank Mr. Don Pisor of San Diego, California, Mr. Gene Everson of Ft. Lauderdale, Florida, and Mrs. Rose D'Attilio of San Diego, California, for allowing us to examine and photograph their Homalocantha specimens; Mr. L. J. Bibbey for giving us information about his visits to the type locality; and Mrs. Barbara Myers and Mrs. Judith Bertsch for comments and assistance.

LITERATURE CITED

Cernohorsky, W.O. 1967. The Muricidae of Fiji (Mollusca: Gastropoda). Part I. Subfamilies Muricinae and Tritonaliinae. Veliger 10 (2); 111-132; plts 14,15; 10 text figs.

Fair, R.H. 1976. The Murex book: an illustrated catalogue of recent Muricidae (Muricinae, Muricopsinae, Ocenebrinae). 138 pp.; 56 figs.; 23 plts.; Sturgis, Honolulu.

Kosuge, S. 1979. Descriptions of two new species of the family Muricidae (Gastropoda, Mollusca). Bull. Inst. Malacology Tokyo 1 (1): 1-2; 1 plt.

Radwin, G.E. and A. D'Attilio. 1976. Murex shells of the world: an illustrated guide to the Muricidae. x + 284 pp.; 192 figs.; 32 plts.; Stanford University Press.

Vokes, E.H. 1978. Muricidae (Mollusca: Gastropoda) from the eastern coast of Africa. Ann. Natal Mus. 23 (2): 375-418; 8 plts.

A REEF REPORT

FORREST POORMAN

15300 Magnolia, Westminister, California 92105

For the past six years we have set up salt water aquaria at our ramada in Bahia San Carlos, Sonora, Mexico. As soon as low tides permitted we would search out small rocks covered with two species of the alga, Caulerpa, which we had discovered were the preferred habitat for Berthelinia chloris and Oxynoe panamensis.* We have enjoyed watching the development of these animals from very small juveniles to full adults. Copulation and egg laying seemed to be nearly daily activities. Several times we have observed hatching and development of the Oxynoe.

Each year when it was time to pack for home and to secure the aquarium, the rocks containing the algae and animals were carefully placed among rocks at low tide on a sheltered reef about 200 meters long. We had never observed Caulerpa on this reef. The sources of our material were about 7 kilometers away in either direction.

For several years, upon returning to San Carlos, we have inspected these plants and found that they were slowly becoming established on the same sheltered reef. In November 1979, at an extreme low tide, we inspected the reef and were amazed to find that both types of algae had spread along the entire reef and, also, somewhat offshore. The two types were intermingled and were growing in even larger patches than at the original sources. Eagerly we searched and found both Berthelinia chloris and Oxynoe panamensis well established on the reef, each on its respective species of Caulerpa.

Another marine alga we have been observing is Padina durvillae, which is the habitat for many opisthobranchs. For several years the great patches of this cabbage-like plant had been missing and we could find only isolated small buds on rocks in tide pools. This year Padina was abundant and fully mature on all rocky reefs and on the bottom of bays. The Padina on our special reef showed no evidence of Phyllaplysia padina which had previously been abundant. It did, however, yield several specimens of an undescribed nudibranch, a description of which is now in press.

*The Nautilus. 91(2): 62-66 (25 April 1977).

LIBRARY NOTES

BARBARA W. MYERS

SEA SHELLS OF WESTERN EUROPE. 1979. 144 pp. $8.95
by P. Bouchet, F. Danrigal, C. Huyghens
American Malacologists Inc., Melbourne, Florida
Originally published in French as Coquillages des Atlantiques et de la Manche by Les Editions due Pacifique. 1979.
Translated from the French by B.E. Picton

The spectacular closeup color photographs of living mollusks and their egg capsules are the outstanding feature of this small, hardcover book. Many of the over 125 species shown in fine detail are only a few millimeters in size. The eleven additional color plates are of standard design and picture 136 species.

Although the general information is superficial there are many specific facts regarding habitat, spawning, feeding, etc. throughout the text. It is limited as an identification reference by its lack of species descriptions.

Through the American Malacologists Inc., our members have the opportunity to purchase this book at a 25% discount provided at least six members sign up to purchase it. The Club's courtesy copy will be available for your inspection at the February meeting. Those interested, please bring your check for $6.95 payable to American Malacologists Inc. to the February meeting.

SAN DIEGO SHELL CLUB
% C. HERTZ
3983 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

LOS ANGELES, CA.
FEB 21
PM
1969
900

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.
CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII March 1980 No. 3

PROGRAM: Don Pisor will give an illustrated talk on "Recent Travels." Pictures of the September Party will also be shown.

Date: Mar. 20, 1980 Time: 7:30 P.M. Room: 104

CONTENTS

Club News..... 23

Seastar predation on Mollusks in the San Felipe Bay area, Baja California, Mexico
GEMMELL, JOYCE, CAROLE M. HERTZ and BARBARA W. MYERS..... 24

SAVE THE DATE: Annual Auction/Potluck is April 26, 1980. Details inside.

DUES ARE DUE BY JANUARY 1 AND ARE DELINQUENT BY APRIL 1. Please send dues to the Club address or to Walter Robertson, Treasurer, by March 24 so you will be included on the 1980 membership roster.

THE ANNUAL AUCTION/POTLUCK
APRIL 26, 1980

The Club's only fundraiser and most glorious social affair is the annual auction. The auction proceeds provide the major portion of the Club's operating funds. The Festivus depends on its success for its budget. The Club's purchases for the library, donations to scientific publications, and participation in the Greater San Diego Science Fair hinge on the generosity of Club members in donating and buying at the auction.

As a result of the cancellation of the February meeting because of storm conditions few donations have been received. Since time is growing short, members are urgently requested to bring their specimen shells for donation to the March meeting or make arrangements with a Board member for either delivery or pickup.

As in the past several years, the auction will be held at the home of Marge and Hugh Bradner. Details and map will appear in the April issue.

THE GREATER SAN DIEGO SCIENCE FAIR

This is the Club's eighth year of participation in the Science Fair. On April 16 the Club Science Fair Committee, chaired by Anthony D'Attilio, will give the Club award to an upper division entrant in the area of marine life. The winner will be invited to give a presentation to the Club at the June meeting at which time the Club prize will be presented: a choice of one of the following three books, Barnes' Invertebrate Zoology, Radwin & D'Attilio's Murex Shells of the World or Ricketts & Calvin's Between Pacific Tides.

NEEDED: Club Botanical Foundation Representative who will attend one evening meeting a month at the Casa Del Prado. (It is through the Botanical Foundation that we meet without charge in the Casa Del Prado). Contact Sandie Seckington at 462-9455

LIBRARY NOTE

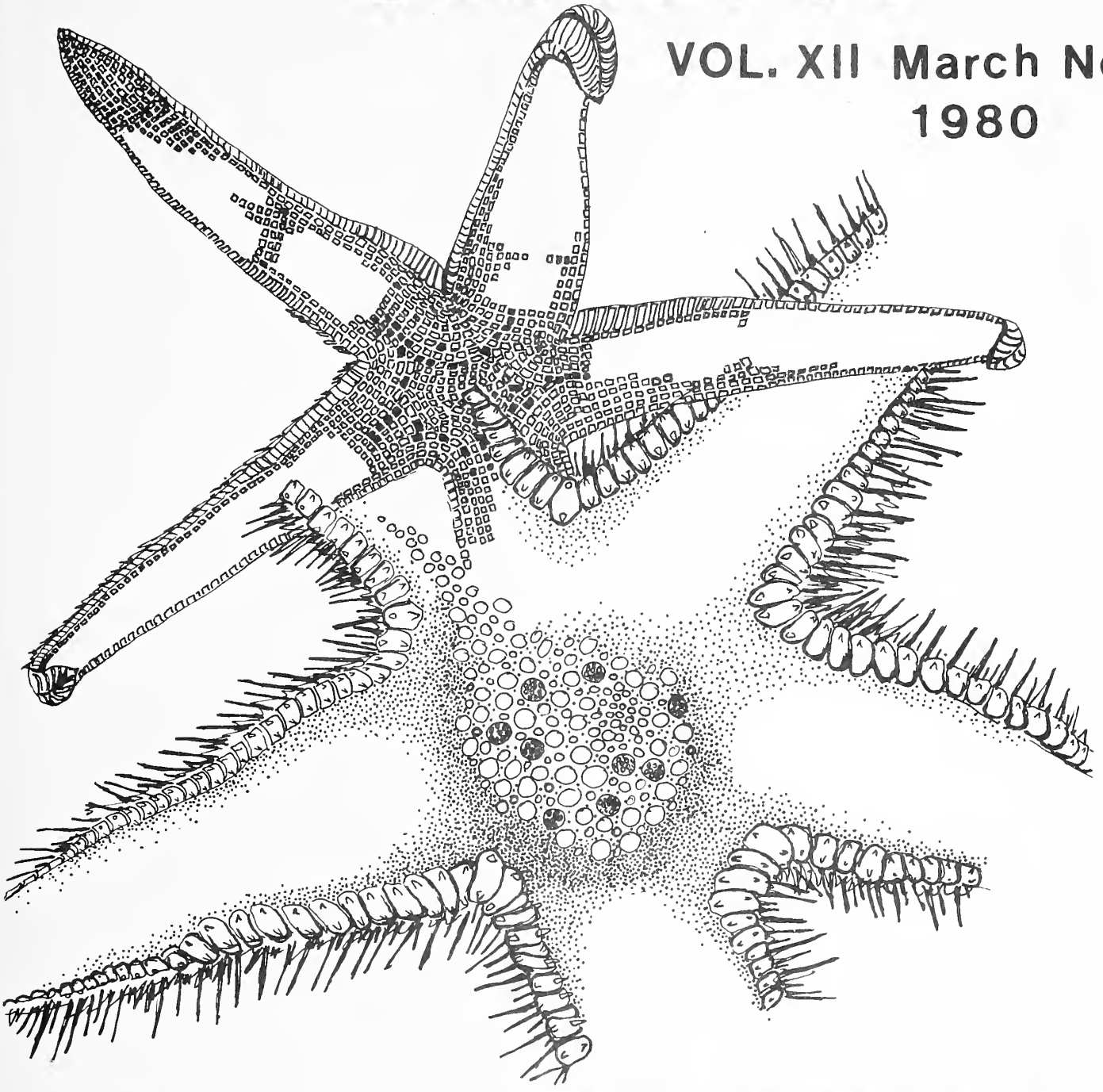
The two new books listed below have been purchased by the Club and will be available for circulation at the April meeting.

A REVIEW OF THE TRIVIIDAE (Mollusca: Gastropoda) by Crawford Neill Cate, Memoir 10, San Diego Society of Natural History, June 20, 1979. 126 pp., 41 pls., 177 figs.

HAWAIIAN MARINE SHELLS Reef and Shore Fauna of Hawaii: Section 4. Mollusca by E. Alison Kay, Bishop Museum Press, Honolulu, Hawaii, 653pp., 195 figs.

THE FESTIVUS

VOL. XII March No 3
1980



SEASTAR PREDATION ON MOLLUSKS in the SAN FELIPE BAY AREA BAJA CALIFORNIA, MEXICO

Joyce Gemmell·Carole M.Hertz·Barbara W. Myers

SEASTAR PREDATION ON MOLLUSKS IN THE SAN FELIPE BAY AREA, BAJA CALIFORNIA, MEXICO

JOYCE GEMMELL, CAROLE M. HERTZ, BARBARA W. MYERS

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

ABSTRACT

The mollusks taken from the stomachs of two species of seastars, Luidia (Petalaster) columbia (Gray, 1840) and Astropecten armatus Gray, 1840 were studied. The seastars were collected from the waters surrounding Consag Rock and San Felipe Bay, Baja California, Mexico. The purpose of this paper is to establish the widespread predation on mollusks in the San Felipe area by these two species of seastars. The identification of a number of these species of mollusks made a taxonomic review of the pertinent literature necessary.

INTRODUCTION

Very little prior work has been done on seastar predation on mollusks in the northern Gulf of California. DuShane & Brennan (1969) reported the mollusks collected on a three day trawling expedition (June 27-29, 1969) off Consag Rock and adjacent areas, many of which were listed from seastars. Phillips (1970) in a limited study described the stomach contents of the seastar Luidia collected intertidally at Playa Almejas, eight miles north of San Felipe. Phillips was uncertain in his identification of the seastar and called it Luidia foliolata Grube, a species most often found from southeast Alaska to San Diego, California.

San Felipe Bay, in the northwestern Gulf of California is a relatively shallow body of water with a sand and mud substrate (Fig. 1). It gradually slopes to a depth of 27 fathoms (49 meters) at a distance of 20 miles offshore, with few rocky outcroppings (Fig. 2). These rocky zones are completely exposed at low tide beyond which the bay consists of undulating sand bars and mud. The only major rocky area is at San Felipe Mt. on the north point of the bay and extending approximately 2½ miles to the town of San Felipe. At the south end of the bay (between Pta. Extrella and Pta. Diggs) is a

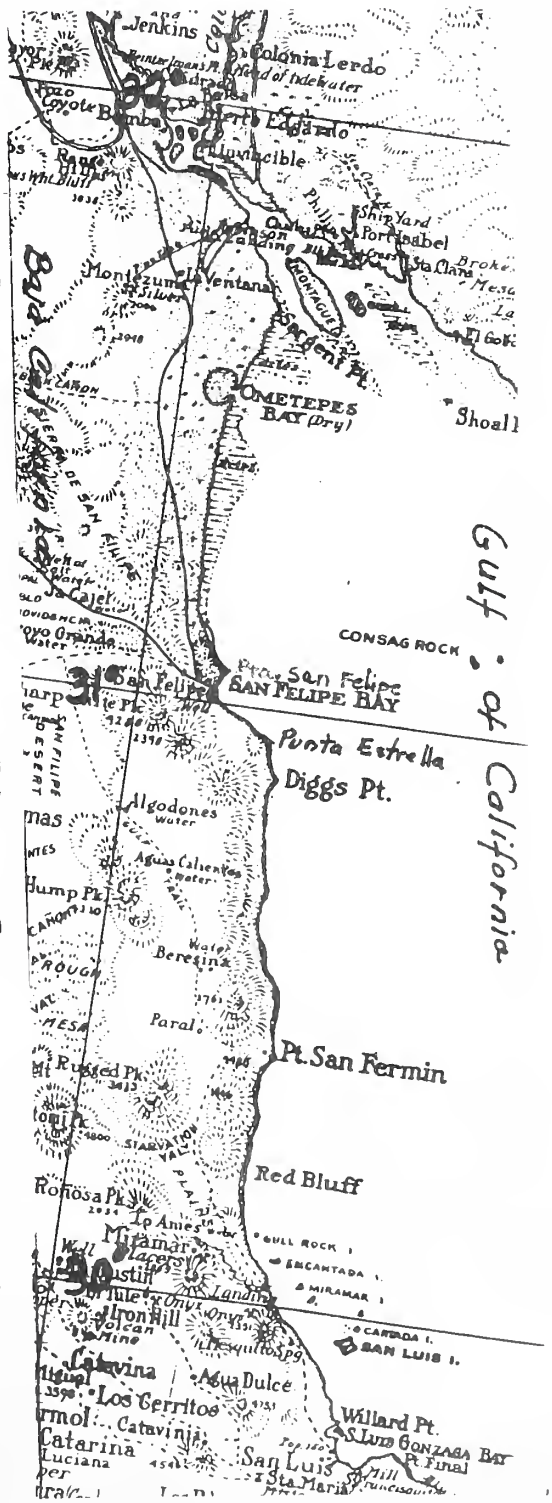


Fig. 1. Map of San Felipe area.

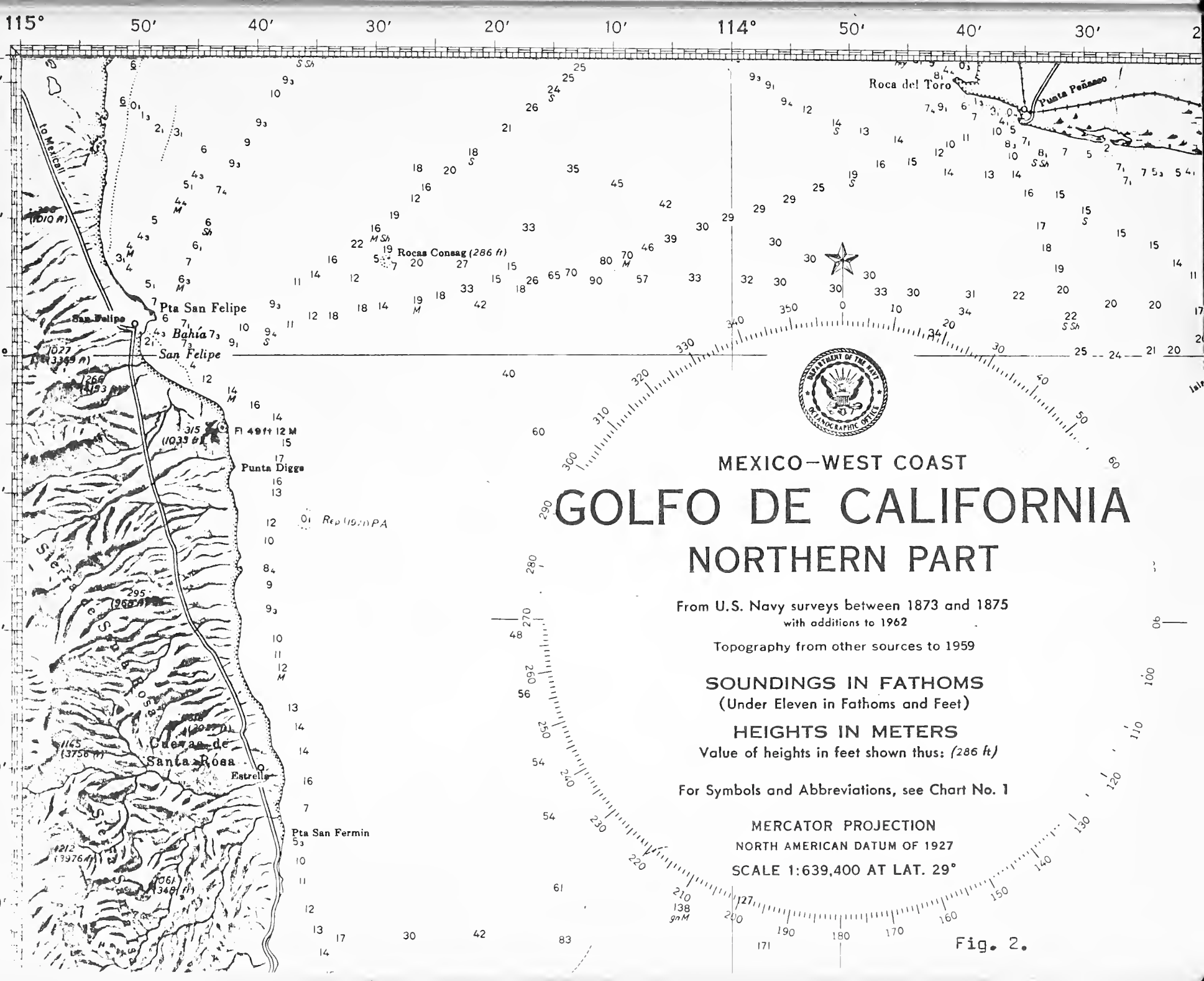

115°
50′
40′
30′
20′
10′
114°
50′
40′
30′
20′
10′
31°
50′
40′
30′
20′
10′
Roca del Toro
Punta Peñasco
Rocas Consag (286 ft)
Pta San Felipe
San Felipe
Bahía San Felipe
Punta Digge
Fl 49ft 12 M
Cuevas de Santa Rosa
Estrella
Pta San Fermin
Sierra de San Pedro Mártir
Sierra de Santa Rosa
Rep (1957) PA
MEXICO—WEST COAST
GOLFO DE CALIFORNIA
NORTHERN PART
From U.S. Navy surveys between 1873 and 1875
with additions to 1962
Topography from other sources to 1959
SOUNDINGS IN FATHOMS
(Under Eleven in Fathoms and Feet)
HEIGHTS IN METERS
Value of heights in feet shown thus: (286 ft)
For Symbols and Abbreviations, see Chart No. 1
MERCATOR PROJECTION
NORTH AMERICAN DATUM OF 1927
SCALE 1:639,400 AT LAT. 29°

Fig. 2.

shelf of shelly limestone. Other rocky areas occur at the mouths of the arroyos below Pta. Estrella as far south as Puertecitos.

Comprehensive studies of water temperature and salinity have not been done for this area as far as we have been able to ascertain. Robinson (1973) gives sparse general information on water temperature for the northern Gulf but no information on salinity nor specific information on water temperature for the San Felipe area. According to Donald A. Thomson (1974) "sea temperatures off San Felipe are still unavailable although the water on that side of the Gulf is considerably warmer than on the Sonoran side."

BACKGROUND INFORMATION: LUIDIA (PETALASTER) COLUMBIA & ASTROPECTEN ARMATUS

Luidia (Petalaster) columbia Gray, 1840 and Astropecten armatus Gray, 1840 are two primitive sand burrowing asteroids in which the tube feet, or podia, lack suckers. Instead they are pointed and adapted for digging in mud or sand. Rock dwelling asteroids have suckers at the tip of the podia which enable them to cling to hard substrates (Barnes, 1973).

These seastars are commonly trawled in the nets of the shrimp boats and are also found at minus tides on the mud flats in the San Felipe area. As the tide flats drain and begin to dry the seastars are outlined in the sand or mud. The color of both species ranges from tan to gray. The average size of the specimens examined is 170 mm for Luidia (Petalaster) columbia and 190 mm for Astropecten armatus.

Asteroids are mainly carnivorous. They feed on mollusks, crustaceans, polychaetes, other echinoderms, fish, etc. In some species, the seastar is able to evert its stomach through its mouth, the stomach then engulfing the prey. Digestion may begin outside the body. In preying on oysters or clams, the seastar holds the gape of the bivalve against its mouth, then everts its stomach which can squeeze through a minute (0.1 mm) opening, and digestion begins (Barnes, 1973). Astropecten and Luidia, however, do not evert their stomachs. The prey is swallowed whole and digested within the body. Shells and other indigestible material are then disgorged from the mouth (Barnes, 1973).

In this study we have listed the molluscan fauna found in the stomachs of these two seastars in the San Felipe area. Conclusions concerning the feeding habits and food preferences, percentages of invertebrates consumed, etc. are not within the scope of this project.

Seastar feeding habits were studied by Hulings and Hemlay (1963). Among the seastars studied was a species of Astropecten and a species of Luidia. Gastropods accounted for 60% of the animals in the stomachs of Astropecten and only 2% of the contents of the stomachs of Luidia. Wells et. al. (1961) studied Astropecten articulatus and found that mollusks predominated the animals ingested; 73 species of mollusks were taken from a total of 91 invertebrates. Hunt (1925) also studied species of Astropecten and Luidia off the coast of England. Again mollusks were the most often ingested invertebrates for Astropecten and echinoderms for Luidia. Phillips (1970) recorded that he found no trace of echinoderms in his study of Luidia and listed mollusks as the predominant prey. In our study Luidia was the predominant seastar and mollusks were a significant portion of the stomach contents.

The seastars were individually opened across the oral surface separating the plates along the ambulacral grooves. Since the stomach extends out into the rays it was necessary to flush the rays with water to obtain the specimens hidden there. The material collected was then sorted for mollusks.

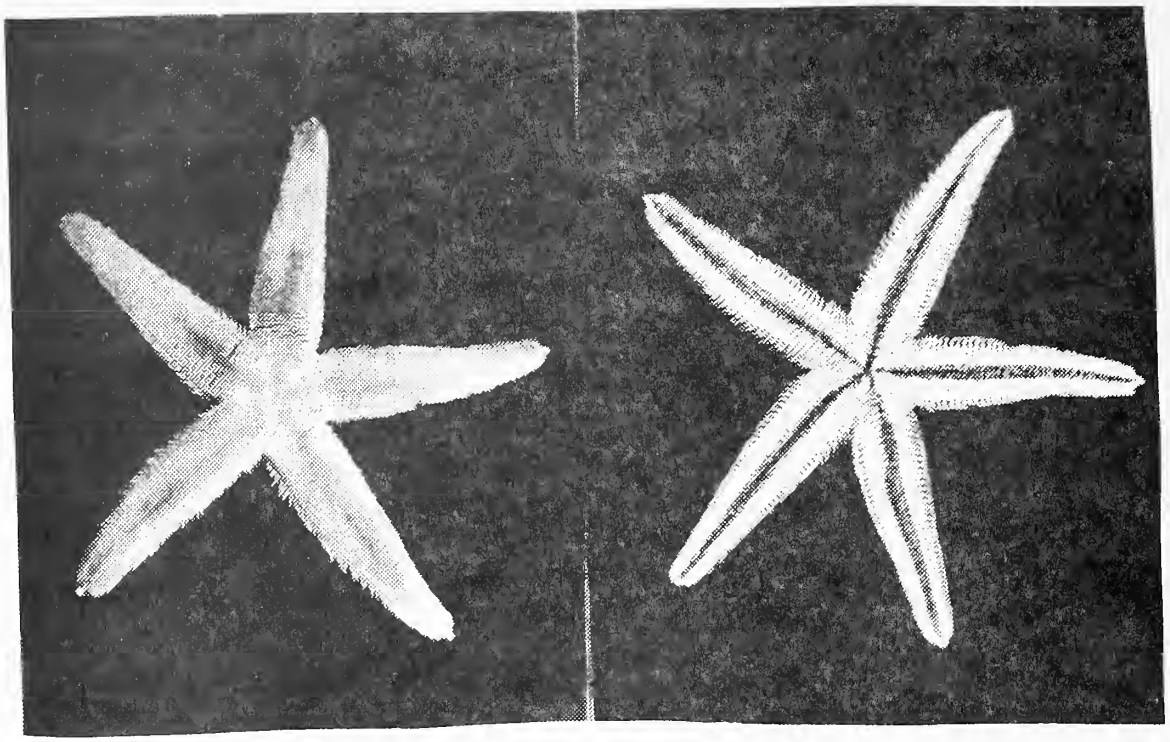


Fig. 3a. Dorsal view Fig. 3b. Ventral view
Luidia (*Petalaster*) *columbia* (Gray, 1840)

A careful review of the literature was necessary in identifying the two species of seastars involved in this study and in resolving the taxonomic problems encountered.

Luidia (*Petalaster*) *columbia* (Gray, 1840) (Figs. 3a,3b)

Petalaster columbia Gray, 1840. Ann. & Mag. Nat. Hist. 6:183.
Luidia (*Petalaster*) *brevispina* (Lütken, 1871). Doderlein, 1920. Die Asteriden der Siboga Exp. Monog. 46b pp. 239, 253.
Luidia columbia (Gray, 1840). Clark, 1953. Bull. Brit. Mus. Zool. 1:381.
Petalaster columbia (Gray, 1840). Fell, 1963. Roy. Soc. Lon. Phil. Trans. Ser. B. 246:433.

Although Gray (1840) separated *Petalaster* Gray, in the same paper from *Luidia* Forbes, 1839, later workers considered them congeneric and placed *Petalaster* in the synonomy of *Luidia*. Doderlein (1920) recognized *Petalaster* as a subgenus of *Luidia*. However, Doderlein's *Luidia* (*Petalaster*) *columbia* is a description of *L. tessellata* Lütken, 1851. *Luidia* (*Petalaster*) *brevispina* Lutken, 1871 is a synonym of *L. columbia* Gray, 1840. For clarification of the nomenclature see Clark (1953).

Fell (1963) in an important paper "The Phylogeny of Seastars," discovered that the family Luidiidae was structurally different from other asteroids and that they are the most primitive living seastars. He removed Luidiidae from the order Phanerozonia and referred it to the order Platyasterida known only from Paleozoic fossils. He recognized *Petalaster* as a separate genus, but speculated that perhaps it should only have subgeneric status. Moore (1966) places *Petalaster* in the synonomy of *Luidia*, and states it may have subgeneric status. We concur. Therefore we are following Doderlein (1920) and recognizing *Petalaster* as a subgenus of *Luidia* for this species.

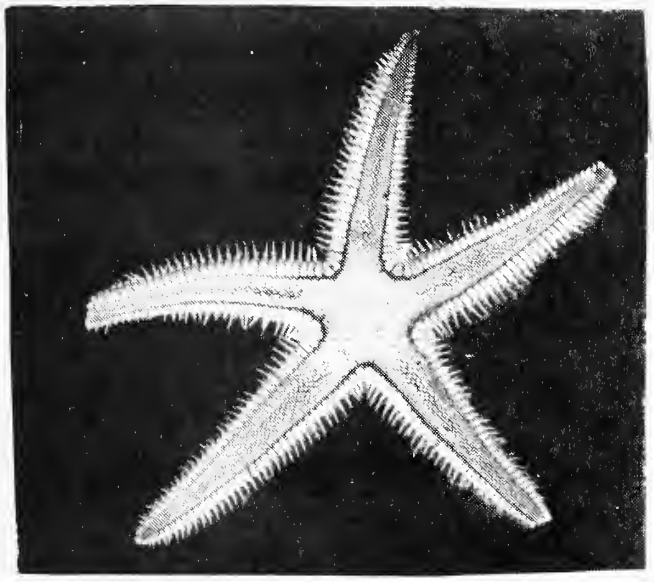


Fig. 4a. Dorsal view

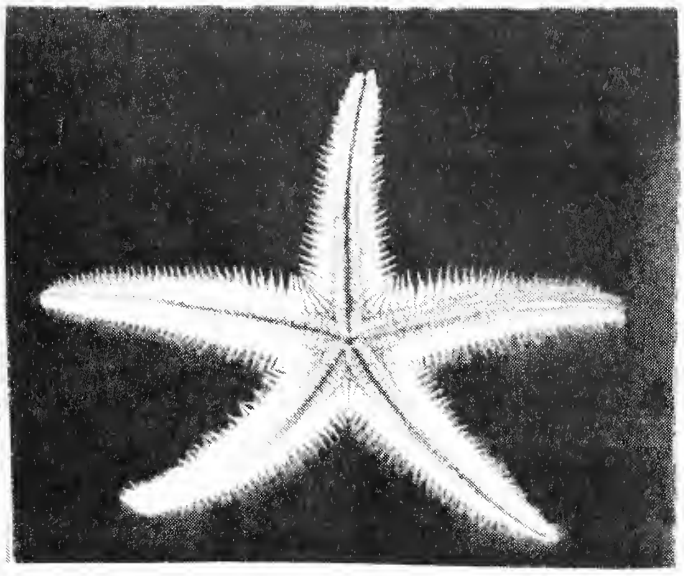


Fig. 4b. Ventral view

Astropecten armatus Gray, 1840

Astropecten armatus Gray, 1840 (Figs. 4a, 4b)

Astropecten armatus Gray, 1840. Ann. & Mag. Nat. Hist. 6:181.
Astropecten armatus Gray, 1840. Fisher, 1911. Bull. U.S.N.M. 76, Pt. 1, p. 56; Fisher, 1930. Bull. U.S.N.M. 76. Pt. 3. p. 189.
Astropecten brasiliensis armatus Gray, 1840. Döderlein, 1917. Die Asteriden der Siboga Exp. Monog. 46a. pp. 84, 170; John, 1948. Novitates Zool. 42:503; Hopkins and Crozier, 1966. Bull. S. Cal. Acad. Sci. 65:131.

We are following Fisher (1930) in retaining Gray's original name for this species rather than making it a subspecies of an Atlantic form. In any case Gray's name has two years priority over Astropecten brasiliensis Müller and Troschel, 1842

COLLECTING STATIONS AND DATES

The collecting for this study was done from May 1968 through March 1974 by Joyce Gemmell. Seastars were taken both intertidally and from shrimp trawlers in deep water. In the second instance the specimens were taken in shrimp nets. Dredges were never used. The majority of the specimens were collected by Joyce Gemmell from June 27-29, 1968 aboard the Chamizal I shrimp trawler

The study area for this paper is from 31° 20'18" N. to 30°41' N. and from 114°17'36" W. to 114°48' W. See Fig. 2. The collecting stations given in DuShane & Brennan (1969) were not workable for mollusks collected from seastars since it was not possible to closely pinpoint the locations from which these ingested mollusks were collected. Our stations A through D each encompass several of those of DuShane and Brennan and we have noted their station numbers in brackets.

Station A [1-5] is from 30°41' N. to 30°51'12" N. and from 114°32' W. to 114°41' W. This station includes an area from Punta Estrella south for a distance of 22 miles, approximately 3 miles offshore. The bottom is sandy throughout. Trawling was from 5 to 10 fathoms. Collecting date: 27 June 1968.

Station B [6-9] is from 31°05' N. to 31°20'18" N. and from 114°21' W. to 114°30'30" W. This station follows a path from 2 miles southwest of Consag Rock to an area 8 miles ENE of it, a distance of approximately 10 miles. The bottom is unknown. Many gorgonians were brought up with the seastars in the nets.
Collecting date: 28 June 1968.

Station C [10-11] is from 31°20'18" N. to 31°02'30" N. and from 114°41' W. to 114°48' W. This station runs from ¾ mile to 5 miles off shore north of Punta San Felipe. The bottom varied from sand and mud to embedded rock rubble near Punta San Felipe. A few small rocks and a hydroid came up near Punta San Felipe. Trawling at this station was from 6 to 14 fathoms.
Collecting date: 28 June 1968.

Station D [12-16] is from 31°12'12" N. to 31°12' N. and from 114°17'36" W. to 114°31'30" W. This station includes an area from approximately 5 miles south of Consag Rock to 10 miles ENE of the rock. Trawling at this station was done in deeper water from about 11 to 21 fathoms. The bottom is sand and clay. The least number of seastars came from this station.
Collecting date: 29 June 1968.

Station E is Radar Beach near Punta Estrella at the south end of San Felipe Bay. Collecting here was intertidal at a -5.0ft. low tide.
Collecting date: 1 June 1969.

Station F is Campo Uno on the south side of Punta San Felipe. Collecting here was intertidal at a -5.0 ft. low tide.
Collecting dates: 8-10 March 1974.

Station G is San Felipe Bay. For this station there are a number of collecting dates and conditions which are detailed in the annotated list of species.

FORMAT FOR THE ANNOTATED LIST OF SPECIES

The species collected are arranged systematically according to Keen (1971). Subgeneric classifications are omitted generally, being used only in discussions when their study was necessary for identification and understanding the taxonomy. Where the species have not been previously reported from the San Felipe area, range extensions are noted. Many of these will be treated fully, by the authors, in a larger work on mollusks from the San Felipe area now in preparation.

Each listed species lot has a catalogue number, i.e. G-245. The "G" refers to its number in the Gemmell collection which is presently housed as an entity in the Department of Marine Invertebrates of the San Diego Natural History Museum (S.D.N.H.M.). The "S" signifies that the specimens were taken from seastars in contrast to other specimens of the same species in the Gemmell collection.

The entry for each species includes data on the number collected, sizes of specimens, dates collected and station numbers. Where further study was necessary, a discussion follows the pertinent collecting information. For those entries not accompanied by a text figure or photograph, a figure reference is given.

ANNOTATED LIST OF SPECIES

BIVALVIA

Nucula (Ennucula) sp.
Figure reference: text figure 5
Lot data: G-3365, 2 specimens each 6 mm long.
Collecting data: Station C
Discussion: We have placed this species in Ennucula Iredale, 1931 because the inner margin of the shell is smooth as sposed to Nucula s.s. which has a crenulate inner margin. Further work is necessary to determine the species. Study material in the SDNHM and LACM(NH) was insufficinet for positive identification.

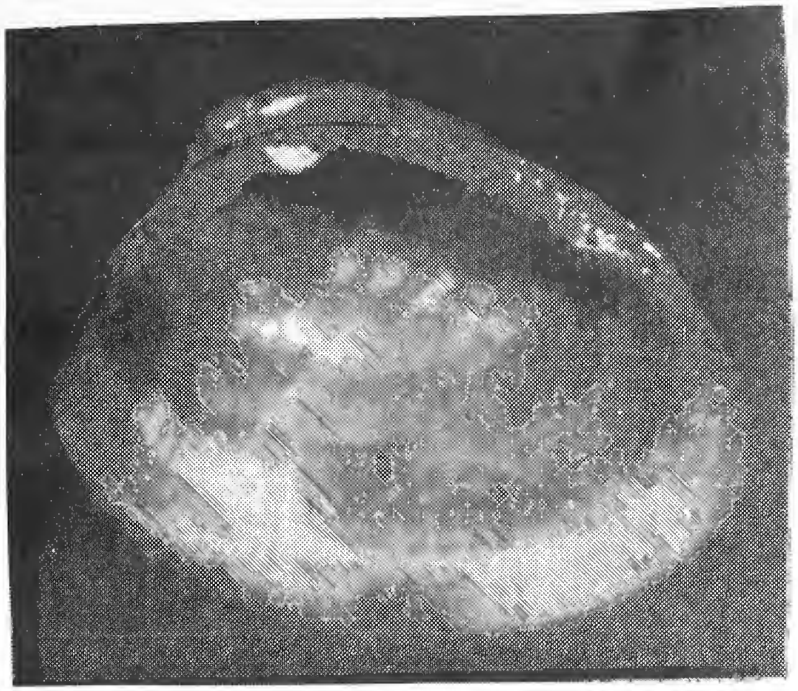


Fig. 5. Right valve, Nucula (Ennucula) sp. size: 6 mm

Nuculana costellata (Sowerby, 1833)
Figure reference: Keen #16
Lot data: G-3375, 8 specimens, 4.0 to 9.0 mm long.
Collecting data: Station G, dredged by shrimpboat 2 miles offshore in sand and mud bottom in 50 ft.. 1 April 1973.
Range: Keen (1971) lists the range for this species from Santa Inez Bay, Baja California to Colombia. The Gemmell specimens place the species in San Felipe Bay.

Nuculana acrita (Dall, 1908)
Figure reference: Keen #19
Lot data: G-3385, 2 specimens, 1.0 and 1.5 mm long.
Collecting data: Station C
Range: Keen (1971) reported this species from Punta Peñasco, Sonora, Mexico to Panama. DuShane & Brennan (1969) extend the range of synonym N. laeviradius (Pilsbry & Lowe, 1932) to the San Felipe area.

Nuculana impar (Pilsbry & Lowe, 1932)
Figure references: Pils. & Lowe (1932) pl. 17, figs. 3-6; Keen (1971) color pl. 12, fig. 1.
Lot data: G-3395, 7 juvenile specimens, 8.0 to 13.0 mm long.
Collecting data: Station C
Discussion: Pilsbry & Lowe (1932) illustrated a juvenile specimen and mentioned the thin, light grayish-olive periostracum. We noted this on the Gemmell specimens.
Range: Keen (1971) gives Punta Peñasco, Sonora, Mexico as the northern end of the range. DuShane & Brennan (1969) extend the range to the San Felipe area.

Anadara multicostata (Sowerby, 1833)
Figure reference: Keen #90
Lot data: G-3475, 1 juvenile specimen 3 mm long.
Collecting data: Station A
Discussion: This juvenile from a seastar as well as other juveniles in the Gemmell collection has a brown periostracum; the adults in the collection have a brownish-black periostracum.

Glycymeris maculata (Broderip, 1832)
Figure reference: Keen #112
Lot data: G-352S, 3 juvenile specimens 5 mm long.
Collecting data: Station G, dredged by shrimp-boat in 50 ft., 11 November 1971.

Lioberus salvadoricus (Hertlein & Strong, 1946)
Figure reference: Keen #135
Lot data: G-359S, 2 juvenile specimens 2.0 to 4.0 mm long and assorted valves.
Collecting data: Station C
Discussion: In the very juvenile (2 mm) specimen, the umbonal ridge which is prominent in the adult is barely visible. Hertlein & Strong in their original description state that the exterior of the shell is smooth. In their key for Volsella (their subgenus for the species) they add, "shell with fine, equal concentric lines of growth." Keen (1971) states that the sculpture is of "raised concentric lines." The Gemmell specimens show no raised lines.

Fig. 6. Trigoniocardia granifera
size: 11 mm

Argopecten circularis (Sowerby, 1835)
Figure reference: Keen #182
Lot data: G-373S, 1 juvenile specimen 7 mm long.
Collecting data: Station C.

Trigoniocardia granifera (Broderip & Sowerby, 1829)
Figure reference: text figure 6.
Lot data: G-405S, 7 juvenile specimens 2.0 to 11.0 mm long.
Collecting data: Station A
Discussion: On uneroded specimens as in Fig. 6, the nodes on the ribs have a sawtoothed appearance.

Tivela argentina (Sowerby, 1835)
Figure references: text figure 7 and for exterior see Keen #384
Lot data: G-411S, 13 juvenile specimens 2.0 to 12.0 mm long.
Collecting data: Station A
Discussion: On the juvenile specimens the sinus is not well developed. Fig. 7 shows the interior of the left valve with muscle scars and the pallial line.

Range: Keen (1971) listed the range from Puerto Peñasco, Sonora, Mex. to Panama. The Gemmell specimens extend the range to the western side of the Gulf at San Felipe.

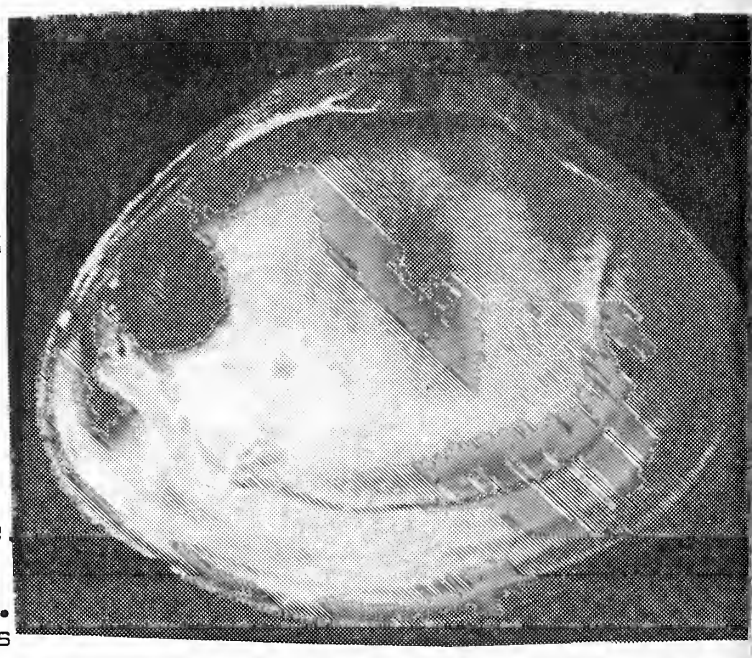


Fig. 7. Tivela argentina
interior of left valve
size: 11 mm

Pitar concinnus (Sowerby, 1835)
Figure reference: Keen #413
Lot data: G-416S, 12 juvenile specimens 2.0 to 6.0 mm long.
Collecting data: Station A

Megapitaria squalida (Sowerby, 1835)
Figure references: text figure 8 and Keen #425 for adult
Lot data: G-417S, 1 juvenile specimen 7.0 mm long.
Collecting data: Station G, intertidal, -4.0 ft. low tide. 18-20 June 1970.
Discussion: The juvenile shows a color pattern which is usually apparent only in the umbonal area of the adult.

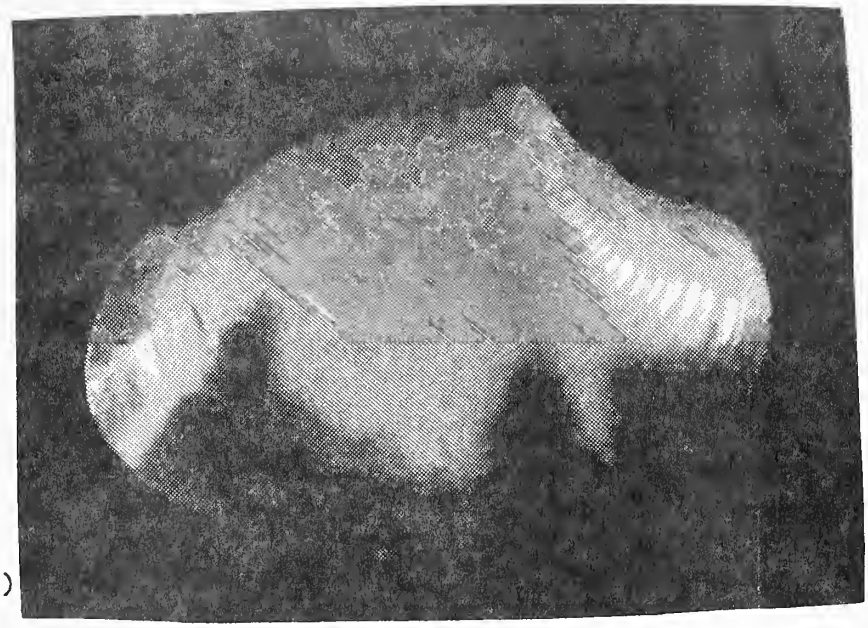


Fig. 8. Megapitaria squalida size: 20 mm

Chione gnidia (Broderip & Sowerby, 1829)
Figure reference: Keen #450
Lot data: G-424S, 14 juvenile specimens 2.0 to 14.0 mm long
Collecting data: Station A

Chione pulicaria (Broderip, 1835)
Figure reference: Keen #455
Lot data: G-425S, 3 juvenile specimens 3.0 to 6.0 mm long
Collecting data: Station A

Chione mariae (Orbigny, 1846)
Figure reference: Keen #460
Lot data: G-426S, 2 juvenile specimens 3.0 to 7.0 mm long and one valve.
Collecting data: Station A

Tellina (Angulus) amianta Dall, 1900
Figure references: text figure 9 and Keen #508 (exterior of shell)
Lot data: G-452S, 12 juvenile specimens 3.0 to 7.0 mm long
Collecting data: Station C
Discussion: The interior view pictured in Fig. 9 shows a specimen lacking the strong right lateral tooth of Moerella Fischer, 1887. The Gemmell specimens have only a tubercle along the posterior end in the right valve as in Angulus Megerle Von Mühlfeld, 1811. Thus, we are following Keen (1971) and Boss (1966) and using the subgenus Angulus. For a detailed description see Olsson (1961) and Hertlein & Strong (1949).

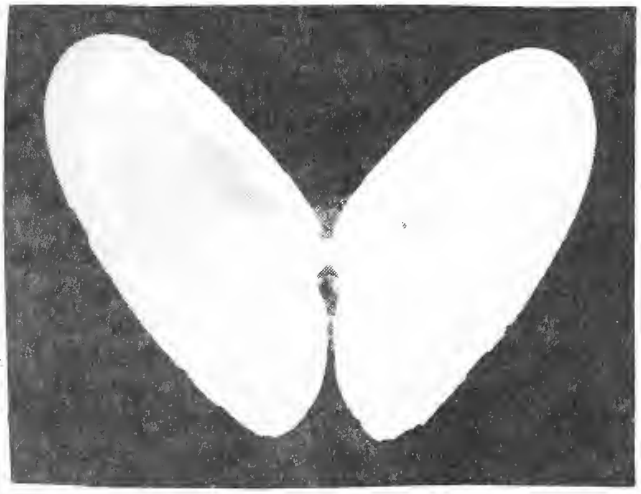


Fig. 9. Tellina (Angulus) amianta interior. size: 7.0 mm

Tellina ulloana Hertlein, 1968
Figure references: text figures 10, 11 and 12
Lot data: G-440S, 4 specimens, juvenile to adult, 3.0 to 9.0 mm long.
Collecting data: Station A
Discussion: Tellina ulloana has a complex nomenclatural history. Hertlein named T. ulloana in 1968 to correct the nomenclature. The description of this species by Hertlein & Strong appeared in 1949 under the name T. proclivis. T. proclivis was to be a replacement name for the Sowerby

(1868) homonym Tellina declivis. For further information see Veliger Vol. 11(1): 80.

Figure 10 shows the interior of both valves of I. ulloana. The grooved cardinal teeth, posterior in the right valve and anterior in the left, are identifying features of this small bivalve.

We were confused by the original description (Hertlein & Strong, 1949 for I. proclivis) which stated the following: "...hinge of right valve with two strong cardinals, the posterior one grooved, and two laterals, left valve with a strong grooved anterior and weaker posterior cardinal, the latter close to the margin, the posterior cardinal in each valve grooved..." The last seven words are contradictory.

Range: Keen (1971) gives the range of this species as Magdalena Bay, Baja California to Panama. The Gemmell specimens extend the northward placement of the species to the San Felipe area.

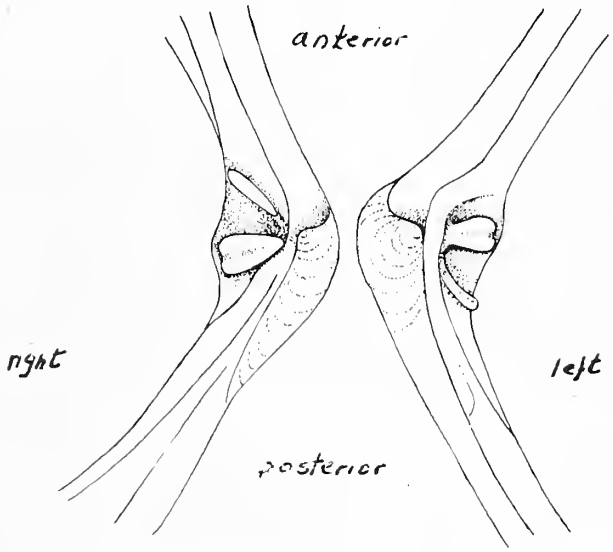


Fig. 10 I. ulloana
interior of right and left valves showing the grooved cardinal teeth

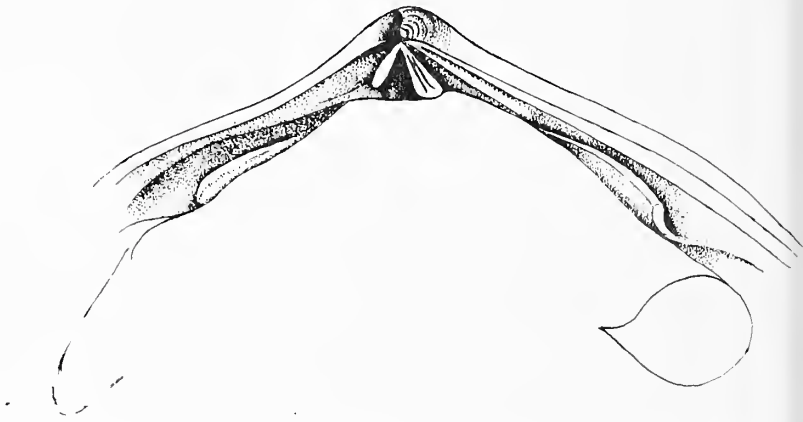


Fig. 11 I. ulloana
interior of right valve showing lateral teeth and muscle scars.

Macoma undulata (Hanley, 1844)
Figure reference: Keen #559
Lot data: G-442S, 1 juvenile specimen 6.0 mm long
Collecting data: Station D.

Macoma elytrum Keen, 1958
Figure references: textfigures 13a, 13b and Keen (1958) p.254, pl. 30.
Lot data: G-442AS, 1 juvenile specimen 10.0 mm long
Collecting data: Station D
Discussion: This species is similar to M. siliqua (C.B. Adams, 1852) but comparison of the hinge teeth of both species shows

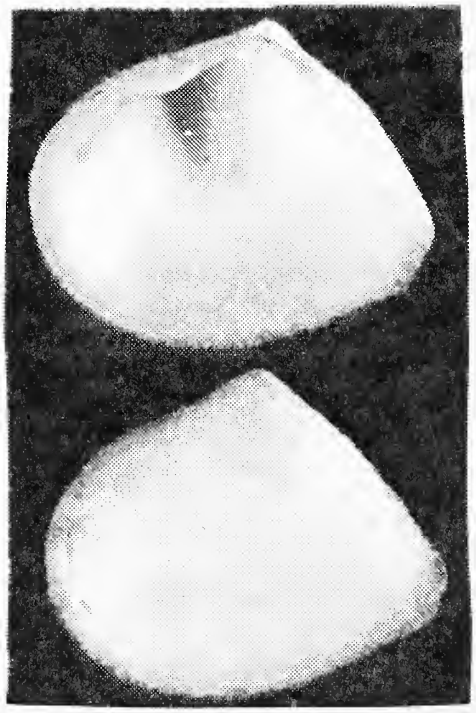


Fig. 12 I. ulloana
size: 7.0 mm

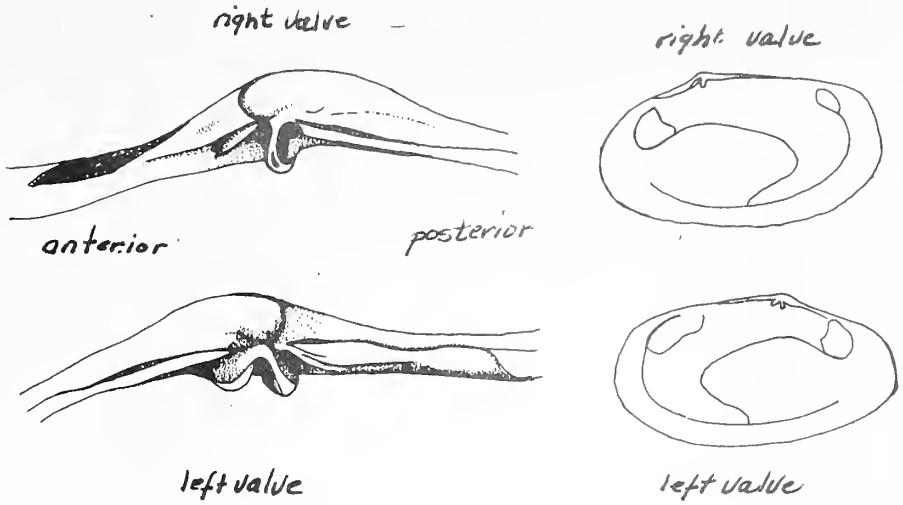


Fig. 13a. Macoma elytrum Fig. 13b.

that the right posterior and left anterior teeth in M. siliqua are deeply grooved whereas in M. elytrum these teeth are only slightly grooved (Figure 13a). The pallial lines are shown in Figure 13b.

In the juvenile Gemmell specimen the right valve has a broken tooth and the grooved tooth is not apparent on the left valve.

Psammotreta viridotincta (Carpenter, 1856)
Figure reference: Keen #572
Lot data: G-448S, 2 juvenile specimens and one valve 14.0 to 15.5 mm long
Collecting data: Station A
Discussion: Our specimens agree with the detailed description of Macoma pacis (Pilsbry & Lowe, 1932), a synonym of Psammotreta viridotincta. Carpenter (1856) gave only a brief general description. Because we were unable to examine the closely related species, P. aurora (Hanley, 1844) and P. pura (Gould, 1853), we are provisionally calling the Gemmell specimens P. viridotincta. However, the umbones of our specimens are salmon colored in contrast to the "umbonibus viridi tinctus" of Carpenter.

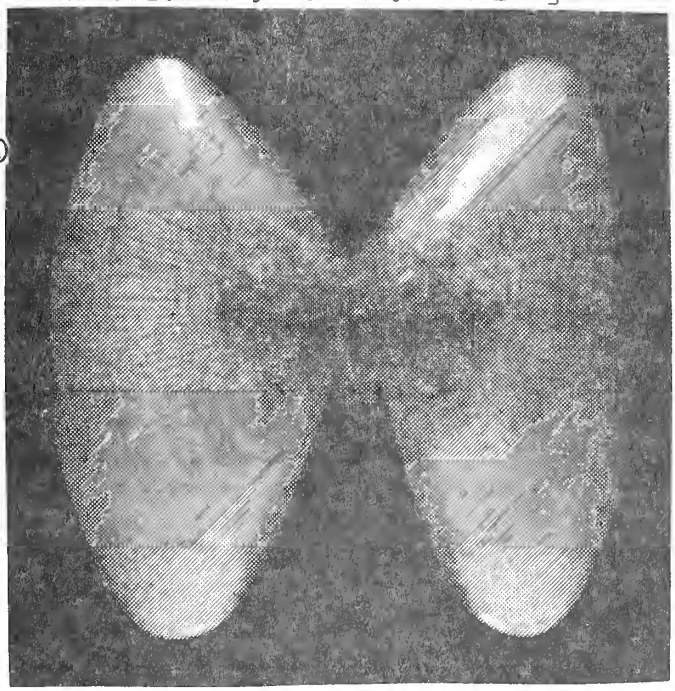


Fig. 14. Donax navicula exterior size: 6.0 mm long. (Wax used on hinge to hold valves in place).

Strigilla cicercula (Philippi, 1846)
Figure reference: Keen #575
Lot data: G-449S, 5 subadult specimens 4.0 to 8.0 mm long
Collecting data: Station D

Donax navicula Hanley, 1845
Figure reference: text figure 14
Lot data: G-451S, 4 juvenile specimens 2.5 to 6.0 mm long
Station: A
Discussion: The original description of Donax navicula states that it has radiating striae beginning midpoint on the valve. The original description of D. gracilis Hanley, 1845 makes no mention of radiating striae. Our examination shows striae on mature D. navicula and none on adult D. gracilis. Since the Gemmell juveniles (2-6 mm) show striae beginning mid-valve, in addition to their more trigonal shape, we have concluded that they are D. navicula.

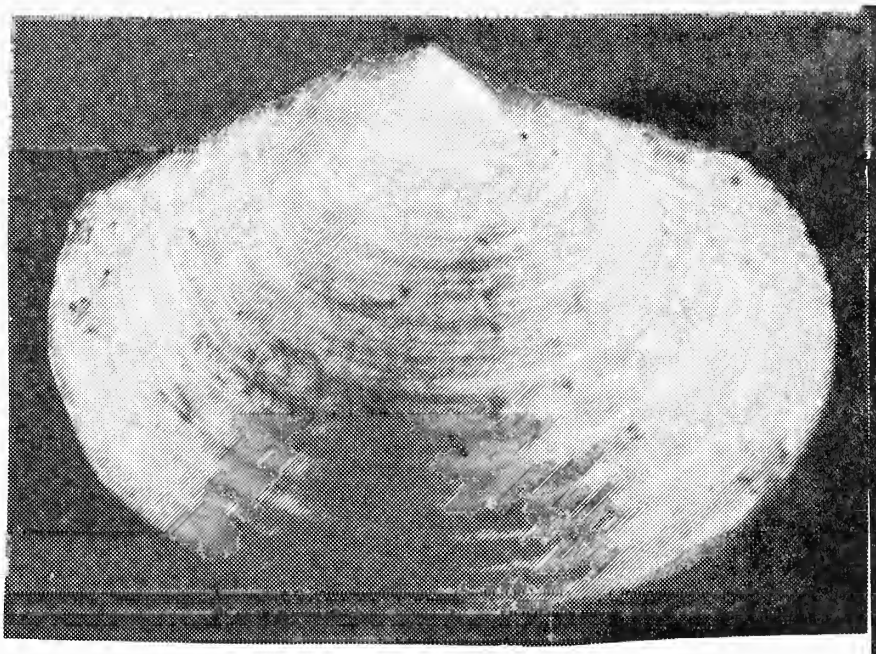


Fig. 15. Semele quaymasensis
size: 11 mm, right valve

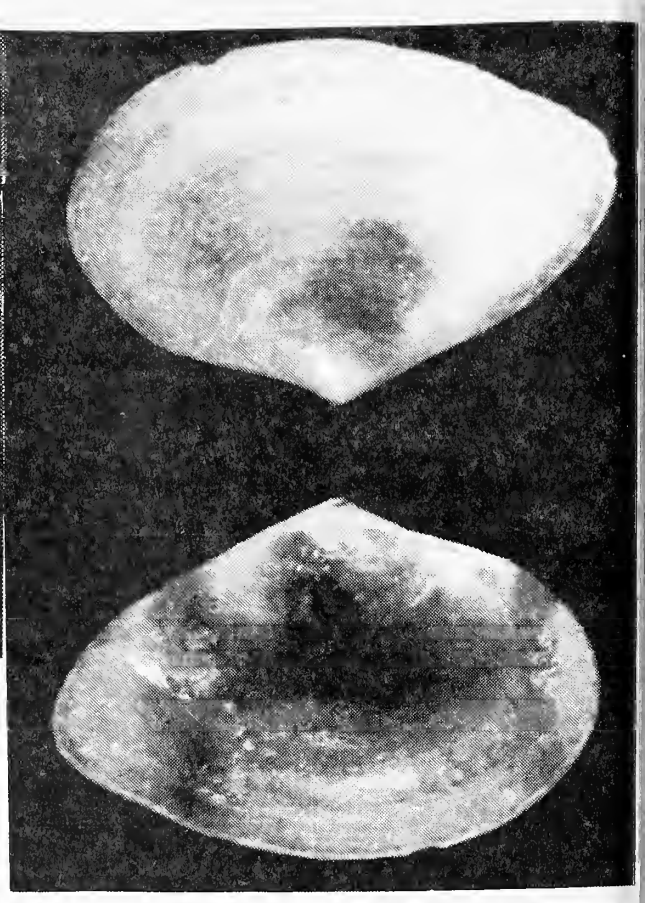


Fig. 16. Cumingia pacifica
size: 10 mm, left valve, exterior
right valve interior

Semele quaymasensis Pilsbry & Lowe, 1932
Figure reference: text figure 15
Lot data: G-4615, 1 juvenile specimen
11 mm long
Collecting data: Station A
Discussion: A distinguishing feature of this species is the radiating lines on the anterior end. A similar species, S. pacifica has radiating lines on both ends. DuShane & Brennan (1969) extended the northern end of the range from Punta Peñasco, Sonora, Mexico to the San Felipe area.

Semele pacifica Dall, 1915
Figure reference: Keen color plate 13, fig. 6
Lot data: G-4625, 5 juvenile specimens 6.0 to 10.0 mm long
Collecting data: Station B
Discussion: This species has radiating lines on both the anterior and posterior ends and the left and right valves are usually different in sculpture.

Abra tepocana Dall, 1915
Figure reference: Keen #655
Lot data: G-4655, 2 specimens 2.0 to 5.0 mm and 1 valve
Collecting data: Station D
Range: DuShane & Brennan (1969) extended the northern end of the range from Puerto Peñasco to the San Felipe area.

Cumingia pacifica (Dall, 1915)
Figure reference: text figure 16
Lot data: G-4664S, 1 juvenile specimen 10.0 mm long
Collecting data: Station D

Corbula nasuta Sowerby, 1833
Figure reference: Keen # 677
Lot data: G-474S, 15 specimens 3.0 to 6.0 mm long
Collecting data: Station G, taken in shrimpboat nets in 25 ft., 15 May, 1968
Lot data: G-474AS, 153 specimens 3.0 to 7.0 mm long
Collecting data: Stations A,B,C,D

Pandora (Pandorella) cornuta C.B. Adams, 1852
Figure references: text figure 17 and for adult see Gemmell (1975) FESTIVUS VI(6)
Lot data: G-482S, 2 juvenile specimens 4.0 and 11.0 mm long
Collecting data: Station A
Discussion: These specimens (and others in the Gemmell collection not from seastars) were placed in the subgenus Pandorella Conrad, 1863 because the specimens showed a lithodesma and a hinge with two crural teeth. In the subgenus Pandora s.s. the lithodesma is absent. In the figured specimen (Fig. 17) the hinge and teeth are not fully developed.

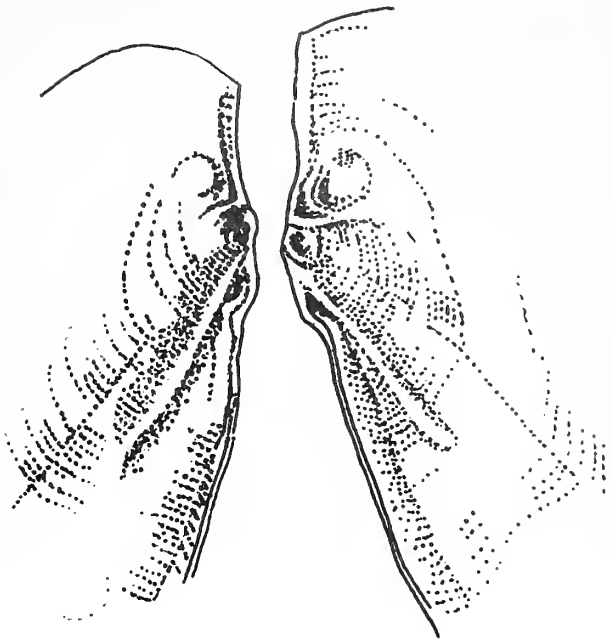


Fig. 17. Pandora (Pandorella) cornuta interior of 4.0 mm juvenile

Range: Keen (1971) gives the locality for this species as Panama. Gemmell (1975) places P. cornuta in the San Felipe area.

Pandora sp.
Lot data: G-483S, 11 juvenile specimens 8.0 to 11.0 mm long
Collecting data: Station A
Discussion: Further work is being done on this species and will be published at a later date.

GASTROPODA

Calliostoma marshalli Lowe, 1935
Figure reference: Keen #85
Lot data: G-16S, 1 juvenile specimen 4.2 mm wide
Collecting data: Station A

Turbo fluctuosus Wood, 1828
Figure references: text figures 18a,b,c
Lot data: G-26S, 1 juvenile specimen 2.25 mm wide
Collecting data: Station D.
Discussion: The juvenile T. fluctuosus shows some of the characteristics of the mature T. mazatlanica Pilsbry & Lowe, 1932 such as the open umbilicus, somewhat stellate early whorls, and granular operculum with a deep central pit. There is no umbilicus in the mature T. fluctuosus and the whorls become more rounded on the periphery. The operculum develops a strong ridge on the perimeter lacking on T. mazatlanica. Figure 18a shows the stellate early whorls and the umbilicus of the

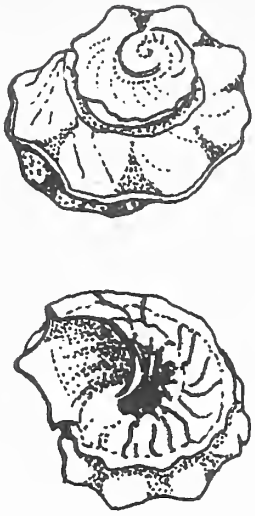


Fig. 18a. T. fluctuosus
size: 2.25 mm wide, 2 views

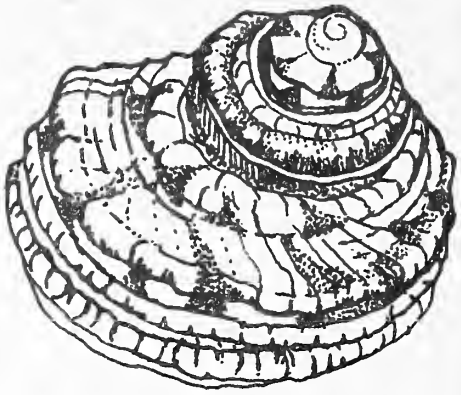


Fig. 18b. T. fluctuosus
size: 9.0 mm wide, 2 views

juvenile. Figure 18b shows the closing of the umbilicus and the gradual rounding of the later whorls. Figure 18c illustrates the operculum of a juvenile specimen

Tricolia variegata (Carpenter, 1864)
Figure reference: text figure 19
Lot data: G-275, 27 specimens 3.5 to 5.0 mm long
Collecting data: Station C

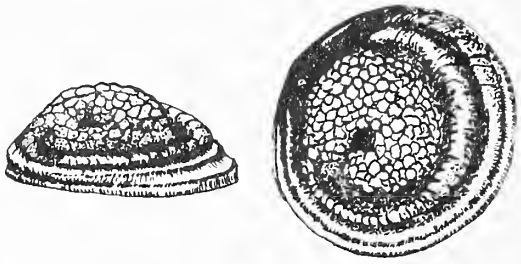


Fig. 18c. operculum of T. fluctuosus
size: 4.0 mm diameter, 2 views

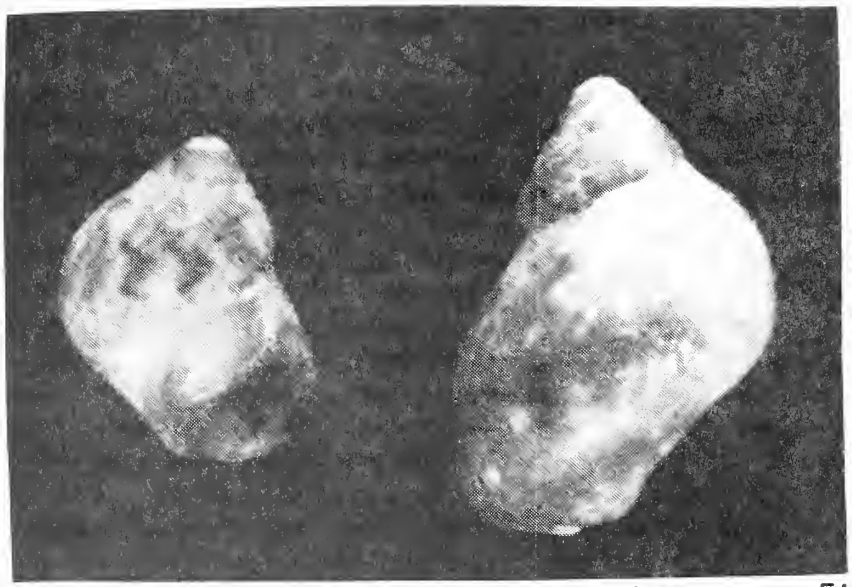


Fig. 19. Tricolia variegata
2 specimens 3.7 and 5.0 mm long

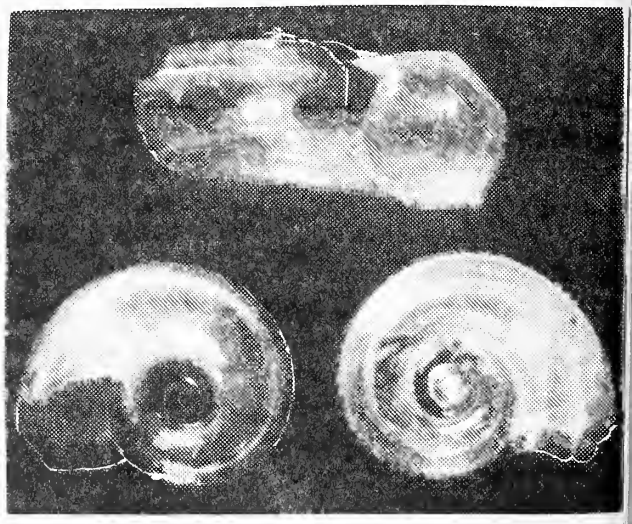


Fig. 20. C. tricarinatus
3 views, 1.9 mm diameter

Cyclostremiscus tricarinatus (C.B. Adams, 1852)
Figure reference: text figure 20
Lot data: G-1055, 53 adult specimens between 1.0 and 2.0 mm in diameter.
Collecting data: Station G, trawled on shrimpboat in 60 to 80 ft., 11 November 1971

Discussion: The original description of this species follows.
"Shell subdiscoidal: white: with three prominemt spiral keels, one on the periphery of the last whorl, and one on each side of it, of which the upper one is visible on the spire; with some irregular transverse striae: spirally striate within the umbilicus: apex subacute: spire convex, a little elevated: whorls three, depressed above and compressed below the keel, with a distinct suture: aperture oblique, orbicular, angulated by the keels: umbilicus wide and deep."
Range: DuShane & Brennan (1969) noted this species is San Felipe.

Turritella anactor Berry, 1957
Figure reference: C.M. Hertz (1979)
Lot data: G-39S, 1 juvenile specimen 25 mm long
Collecting data: Station D

Elephantulum liratocinctum Carpenter. 1857
Figure references: Keen (1968), & J. Hertz (1979)
Lot data: G-42AS, 15 specimens 1.8 to 4.0 mm long
Collecting data: Station A
Discussion: We have placed this species in the genus Elephantulum Carpenter, 1857 instead of Elephantanellum Bartsch, 1920. In examining the Gemmell specimens and those in the SDNHM collection we determined that the annulations were an inconsistent feature. We agree with Abbott (1974) and J. Hertz (1979) and consider Elephantanellum a synonym of Elephantulum.
Range: Keen (1971) lists the range as "Bahía San Luis Gonzaga, Gulf of California to Panama." The Gemmell specimens place the species at San Felipe.

Alaba supralirata Carpenter, 1857
Figure references: text figure 21 and Keen # 562 for adult specimen
Lot data: G-56AS, 21 specimens from 2.0 to 4.0 mm long
Collecting data: Station A
Discussion: Examination of the nucleus of this species easily distinguishes it from A. jeanettae Bartsch, 1910. A. supralirata has 4 nuclear whorls, the first smooth, the rest axially ribbed. A. jeanettae with 4 nuclear whorls has faint axial threads apparent only at the summit of the whorls. See J. Hertz (1978).

Alabina excurvata (Carpenter, 1857)
Figure reference: text figure 22
Lot data: G-57S, approximately 100 specimens 2.0 to 4.5 mm in length
Collecting data: Station A
Discussion: The Gemmell specimens show the variability seen in the original Carpenter drawings [Brann (1966) pl. 39, fig. 412]. In Keen (1971) the original Bartsch (1911) drawing for A. diomedeae, a synonym of A. excurvata is used.

Epitonium walkerianum Hertlein & Strong, 1951
Figure reference: Keen #631
Lot data: G-70S, 2 juvenile specimens 2.8 and 4.0 mm long
Collecting data: Station A

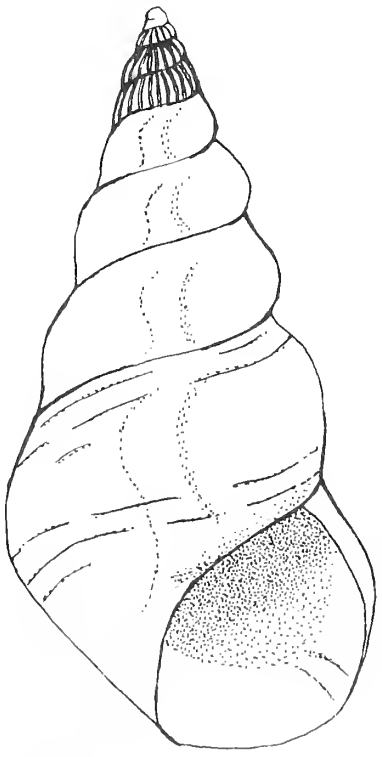


Fig. 21. Alaba supralirata size: 4.0 mm long

Fig. 22. Alabina excurvata
size: 2.0 mm long

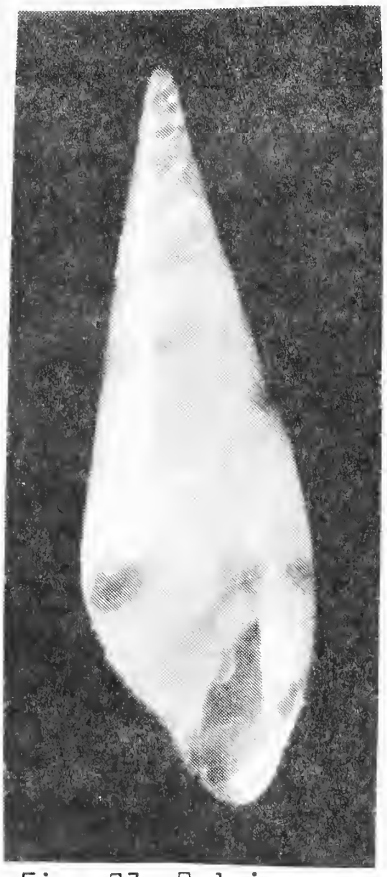


Fig. 23. Balcis sp.
size: 5.0 mm long

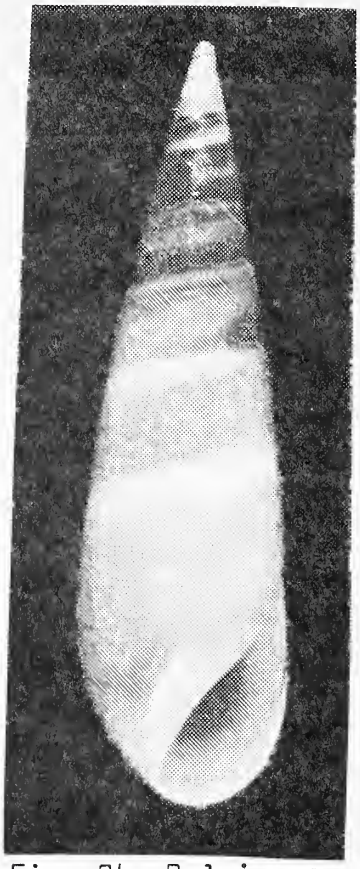


Fig. 24. Balcis sp.
size: 7.0 mm long

Balcis sp.
Figure reference: text figure 23
Lot data: G-82AS, 16 specimens 1.5 to 5.0 mm in length
Collecting data: Station G, intertidal, -4.0 to -6.0 ft. low tides, 11-13 May 1972.
Discussion: These specimens are distinctive by reason of the brown spots. These spots are consistent on the outer lip and appear on the suture at irregular intervals. Other Gemmell specimens not from seastar stomachs were also studied and found consistent with the specimens from seastars.

Balcis sp.
Figure reference: text figure 24.
Lot data: G-82BS, 14 specimens 3.0 to 9.0 mm long
Collecting data: Station G, trawled by shrimpboat, 3-4 March 1972.
Lot data: G-82S, 41 specimens 3.8 to 10.0 mm long
Collecting data: Station G, in 60 to 80 ft in shrimp nets, 11 November 1971
Discussion: This species is distinctive in having a swelling inside on the posterior portion of the outer lip.

Natica broderipiana Recluz, 1844
Figure references: Marincovich (1977) and text figure 25
Lot data: G-110AS, 4 juvenile specimens 5.0 to 9.0 mm in diameter
Collecting data: Station D

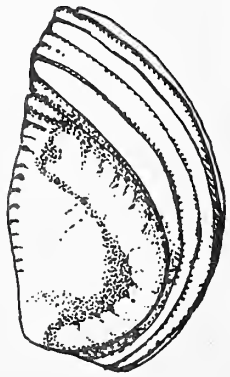


Fig. 25. operculum of Natica broderipiana

Lot data: G-110S, 1 juvenile specimen 4.0 mm in diameter
Collecting data: Station F
Discussion: To determine the species we found the operculum (Fig. 25) the distinctive characteristic. The other shell patterning of the mature N. broderipiana was not apparent on these juveniles. For comparison of N. broderipiana and N. elenae Recluz, 1844 see Marincovich (1977).

Polinices uber (Valenciennes, 1832)
Figure reference: Keen #882
Lot data: G-120S, 8 juvenile specimens 2.5 to 10.0 mm in diameter
Collecting data: Station A

Polinices recluzianus (Deshayes, 1839)
Figure reference: Keen #888
Lot data: G-119S, 8 juvenile specimens 2.0 to 8.0 mm in diameter
Collecting data: Station D

Muricopsis zeteki Hertlein & Strong, 1951
Figure reference: Keen #1007
Lot data: G-143S, 1 juvenile specimen 9.5 mm in length
Collecting data: Station A
Range: Keen (1971) lists the range of this species from "Puertecitos near the head of the Gulf, to Guayaquil, Ecuador." The Gemmell specimen extends the range north approximately 50 miles to San Felipe. (The Gemmell collection includes other M. zeteki from San Felipe to better substantiate the range).

Eupleura muriciformis (Broderip, 1833)
Figure reference: text figure 26
Lot data: G-144S, 3 juvenile specimens 5.8 to 7.5 mm long
Collecting data: Station D

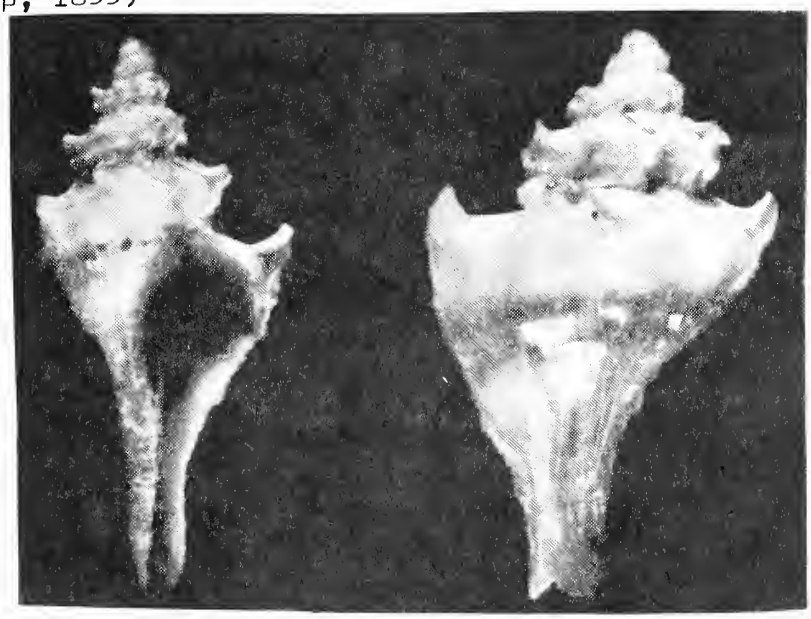


Fig. 26. Eupleura muriciformis, 2 specimens left, 5.8 mm; right, 6.0 mm

Solenosteira macrospira Berry, 1957
Figure reference: Keen #1121
Lot data: G-165S, 6 juvenile specimens 5.0 to 14.0 mm long
Collecting data: Station A
Discussion: Approximately 35 minute Solenosteira from 2.0 to 3.0 mm were taken from the seastars. We could not definitly determine if they were S. macrospira or S. capitaneus Berry, 1957 because the adult sculpture hadn't developed and the periostracum, a differentiating characteristic, is absent. However, they appear the same as those specimens we removed from S. macrospira egg capsules.

Phos gaudens Hinds, 1844
Figure references: text figures 27, 28, and 29
Lot data: G-156S, 6 juvenile specimens 2.0 to 11.2 mm in length
Collecting data: Station D
Discussion: The Gemmell specimens show 4 nuclear whorls which clarify that

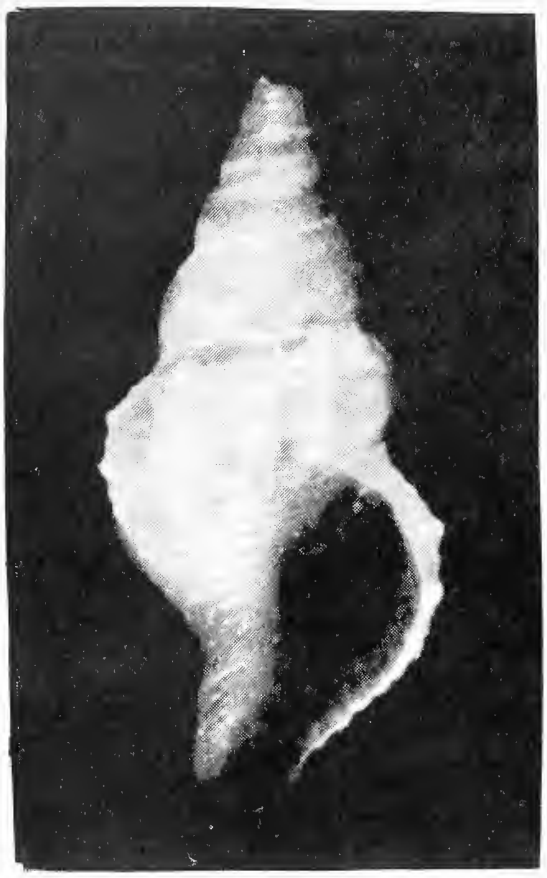


Fig. 27. Phos gaudens
size: 3.0 mm

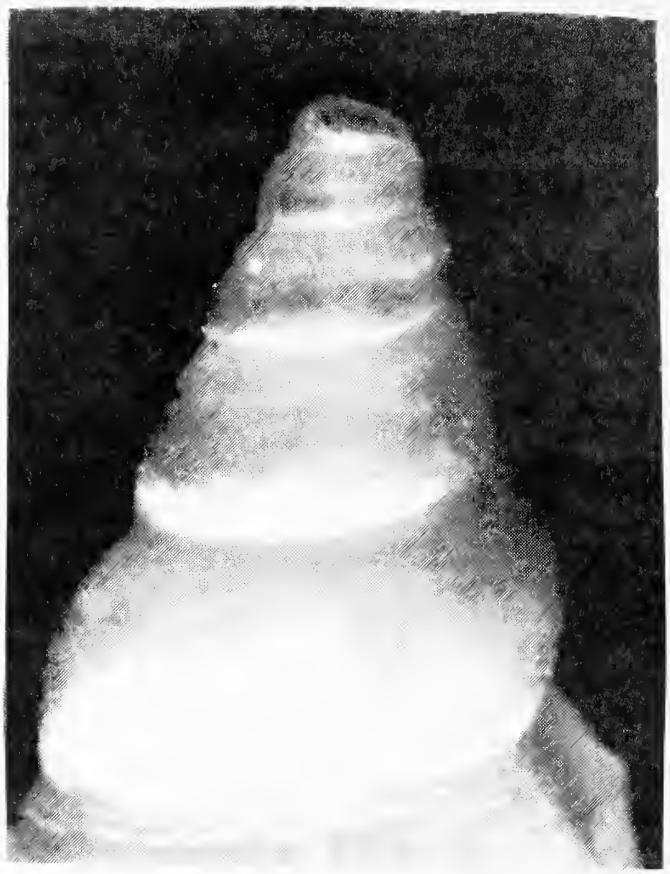


Fig. 28. Protoconch of P. gaudens
(same specimen as in Fig. 27.)

they are Phos gaudens and not P. dejanire (Dall, 1919) which has 3 nuclear whorls.
Range: DuShane & Brennan (1969) extended the northern range from the "Southern end of the Gulf of California, Escondido Bay" (Keen, 1971) to San Felipe.

Anachis varia (Sowerby, 1832)
Figure reference: Keen #1195
Lot data: G-1695, 6 specimens 7.0 to 10.0 mm long
Collecting data: Station B

Cosmioconcha palmeri (Dall, 1913)
Figure reference: Keen #1217
Lot data: G-1715, 5 specimens (3 juveniles & 2 adults) 2.0 to 18.0 mm long
Collecting data: Station A

Nassarina helenae Keen, 1971
Figure references: text figures 30 & 31
Lot data: G-1825, 3 specimens 7.0 to 10.0 mm long
Collecting data: Station A
Discussion: We are calling the Gemmell specimens N. helenae because our specimens match the figure

Fig. 29. Phos gaudens
adult minus protoconch
size: 11.5 mm long

in Keen (1971). However the specimens we studied varied considerably from the original description. The range of variation included 2½ to 3½ nuclear whorls and from 5 to 7 whorls on the teleoconch. We found the sculpture to be beaded and not reticulate. From our study we find that the species does not fit into the subgenus Cigclirina as defined by Woodring (1928).

Zanassarina anitae (Campbell, 1961)
Figure references: text figures 32-35.
Lot data: G-1845, 8 specimens 3.0 to 9.0 mm long
Collecting data: Station D
Discussion: We have placed this species in Zanassarina although our eight specimens show 3½ nuclear whorls instead of the 2½ to 3 in the description of the genus (Pilsbry & Lowe, 1932), (Fig. 32). The holotype of Zanassarina anitae, Stanford University Paleontological Type Collection No. 8530, (Fig. 33) has a broken protoconch. A paratype #TS407 in the SDNHM collection shows 3½ nuclear whorls.

Campbell (1961) in his original description states, "the siphonal canal is not differentiated." The drawing of the canal of the Gemmell specimen (Fig. 34) as well as the holotype (Fig. 33) clearly show a short, well-defined canal. It may be added, to the original description, that when the callus of the inner lip is thickened, the weak columellar plications are completely obscured. (Figs 34 & 35).

Fig. 30. Protoconch of N. helenae

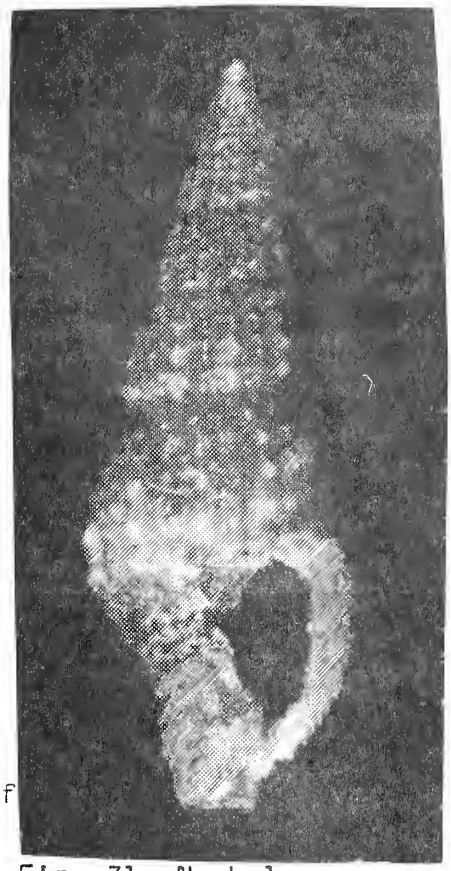


Fig. 31. N. helenae
size: 10.0 mm long

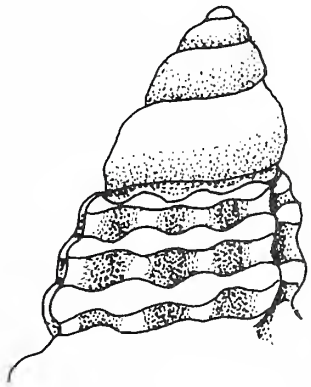


Fig. 32. Drawing of protoconch of Z. anitae

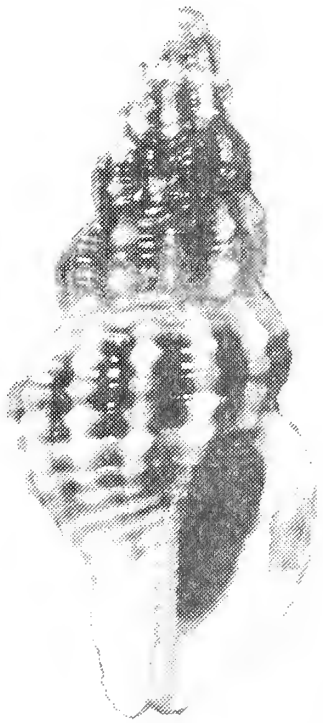


Fig. 33. Holotype of Z. anitae
size: 10.0 mm long

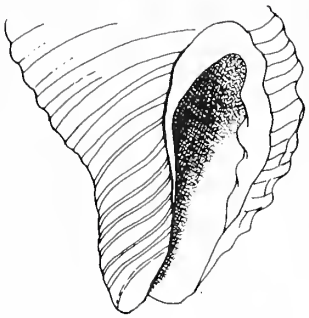


Fig. 34. Detail of canal of Z. anitae

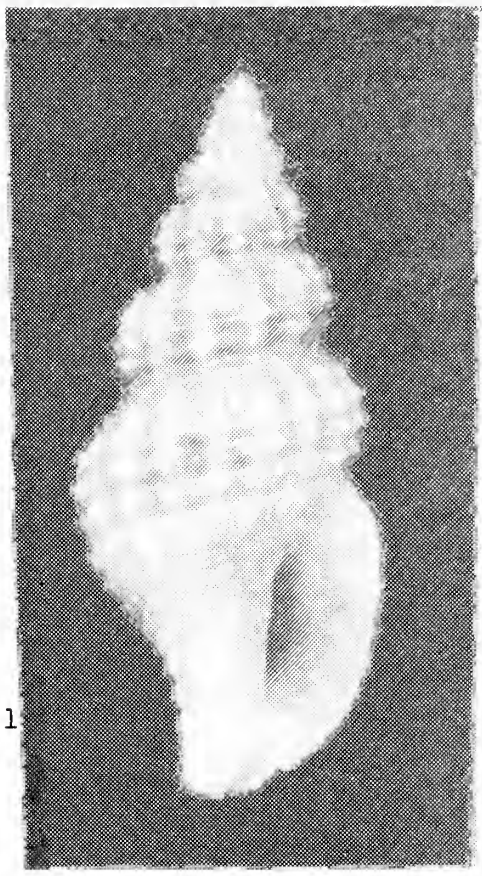


Fig. 35. Z. anitae
size: 9.0 mm long

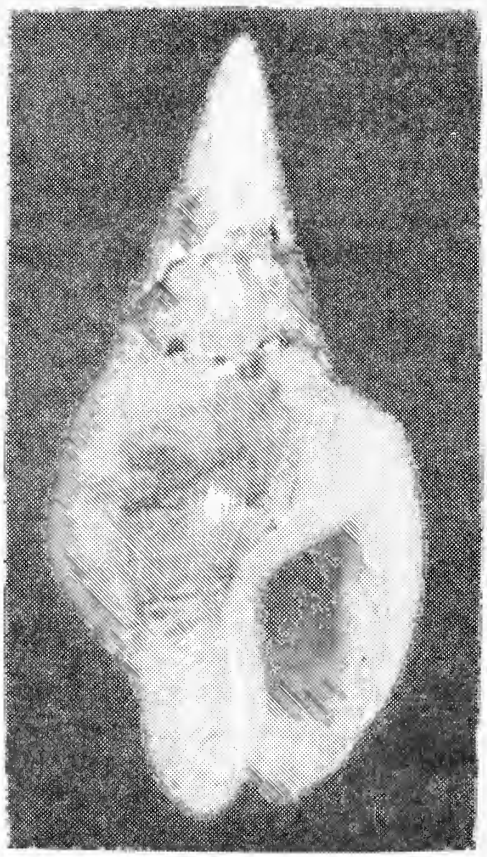


Fig. 36. Strombina gibberula
size: 12.0 mm long

Strombina gibberula (Sowerby, 1832)
Figure reference: text figure 36
Lot data: G-1815, 12 specimens 6.0 to 12.0 mm long
Collecting data: Station D

Nassarius guaymasensis (Pilsbry& Lowe, 1932)
Figure reference: Keen #1302
Lot data: G-1905S, 1 dead specimen with broken nucleus
Collecting data: Station G, dredged by Gemmell boat in 24 ft.

Lot data: G-1905, 3 specimens 9.0 to 13.0 mm long
Collecting data: Station C
Range: DuShane & Brennan (1969) noted this species in San Felipe.

Nassarius pagodus (Reeve, 1844)
Figure reference: text figure 37
Lot data: G-1895, 3 juvenile specimens 5.0 to 9.5 mm long
Collecting data: Station A
Discussion: Keen's (1971) figure #1309 is the Reeve illustration of Triton pagodus (pl. 20, fig. 97) showing a dark brown, banded specimen. In

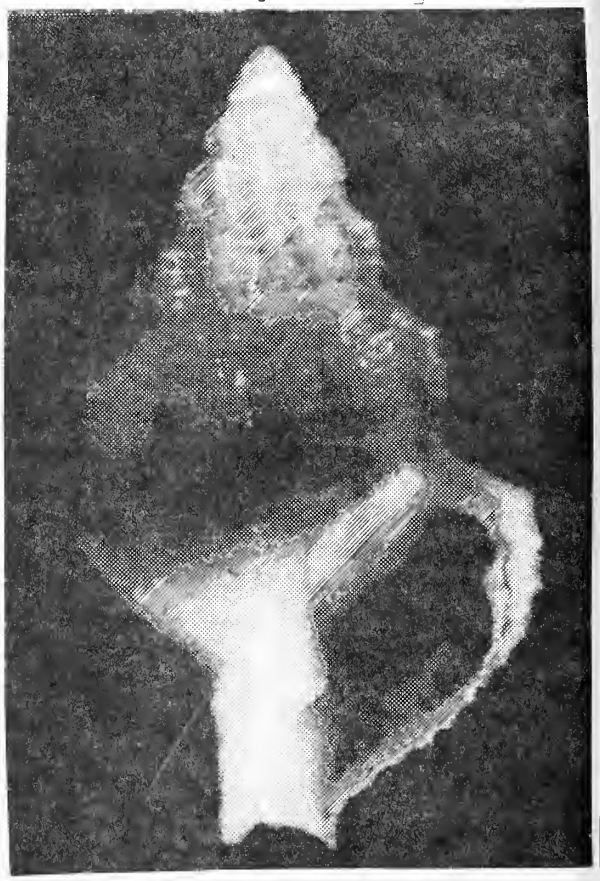


Fig. 37. Nassarius pagodus
size: 9.5 mm long

studying numerous lots of N. pagodus in the SDNHM collection we have observed a wide variability of color, generally ranging from cream-colored, unbanded in the Gulf of California to darkly banded specimens from Panama to Costa Rica. Light colored unbanded specimens occasionally appear in the Panama specimens as well as darker specimens in the Gulf, especially from Guaymas.

Within lots in the SDNHM there is variability in the number of ribs on the body whorl. For example, in lot #3367 from Panama the number of ribs varied from 8 to 11 and in lot # 51890 from Guaymas the ribs on the body whorl varied from 7 to 10.

We believe the Type of Nassa pagodus acuta Carpenter, 1857 figured in Keen (1968) plate 58, fig. 61 falls withing the range of variability for Nassarius pagodus (Reeve, 1844).

Nassarius taeniolatus (Philippi, 1845)
Figure reference: Keen #1313
Lot data: G-195S, 51 specimens 2.0 to 5.0 mm long
Collecting data: Stations: A,B,C,D

Lot data: G-195AS, 7 specimens 2.0 to 5.0 mm long
Collecting data: Station G, trawled on shrimpboat from 60 to 80 ft,, 11 November 1971
Range: DuShane & Brennan (1969) noted the species in San Felipe.

Nassarius iodes (Dall, 1917)
Figure reference: Keen #1318
Lot data: G-197S, 12 specimens 2.0 to 8.0 mm long
Collecting data: Station A

Olivella undatella Lamarck, 1811 (Date fide Sherborn, p. 6725)
Figure reference: Keen #1367
Lot data: G-208S, 1 specimen 9.0 mm long
Collecting data: Station A

Olivella fletcherae Berry, 1958
Figure reference: text figure 38
Lot data: G-214S, 15 adult specimens 5.0 to 8.0 mm long
Collecting data: Station A
Range: DuShane & Brennan (1969) noted this species in San Felipe.

Olivella zanoeta (Duclos, 1835)
Figure references: Olsson, 1956 and Keen, color plate XVII, fig. 4
Lot data: G-217S, 19 juvenile specimens 3.8 to 7.0 mm long
Collecting data: Stations A & C
Discussion: The juvenile Gemmell specimens under 5.0 mm are white and show no banding.

Conus ximines Gray, 1839
Figure reference: Keen #1517
Lot data: G-225S, 3 juvenile specimens 9.3 to 13.0 mm long
Collecting data: Station A

Fig. 38. O. fletcherae
size: 6.8 mm long

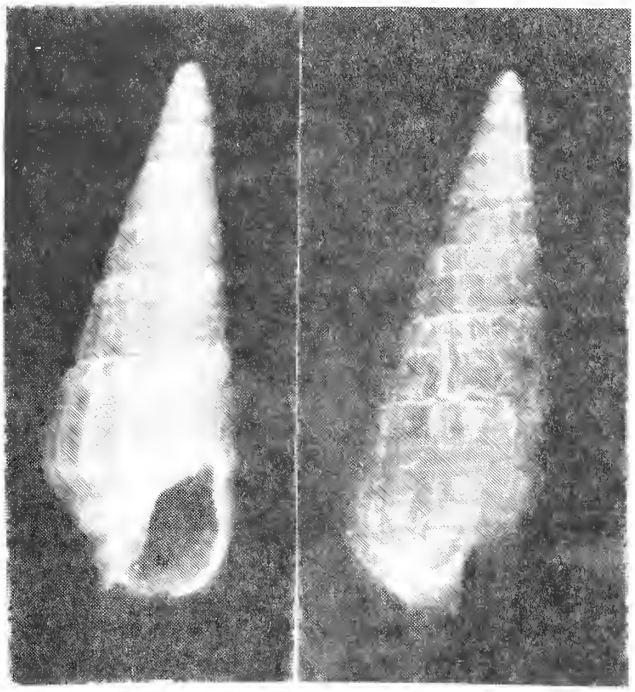


Fig. 39a *Terebra petiveriana* specimen ventral view, 5.0 mm long
Fig. 39b specimen dorsal view, 5.0 mm long

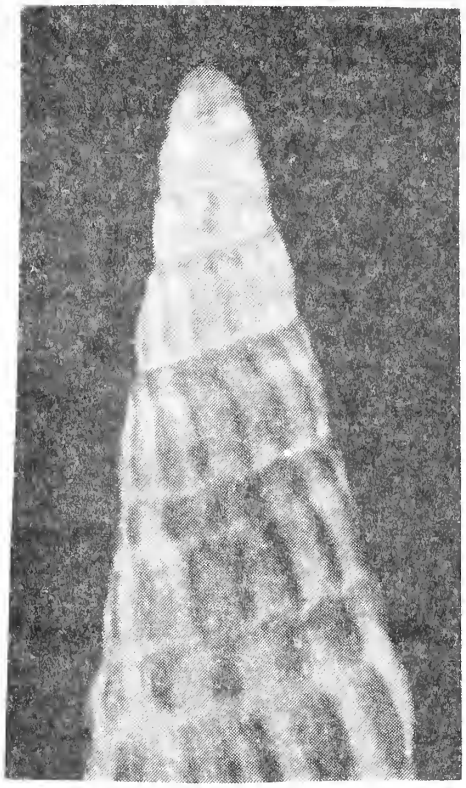


Fig. 40. Protoconch of 5.0 mm specimen of *T. petiveriana*

Terebra petiveriana Deshayes, 1857
Figure references: text figures 39a,b & 40
Lot data: G-2305, 35 juvenile specimens 4.5 to 12.2 mm long
Collecting data: Stations B & C
Discussion: Bratcher (1979) states that the species previously known as *T. glauca* Hinds, 1844 should be called *T. petiveriana* Deshayes, 1857. She states that *T. petiveriana* has two columellar folds; *T. glauca* has none. For the purpose of this paper we are using *T. petiveriana* provisionally although this taxonomic change is not clear to us at this time. Since it is difficult to determine the differences from her figures, we are awaiting a paratype.

Kylix sp.
Figure reference: text figure 41
Lot data: G-2445, 6 specimens 6.0 to 10.0 mm long
Collecting data: Station C
Discussion: These juvenile specimens resemble both *K. ianthe* (Dall, 1919) and *K. hecuba* (Dall, 1919). They are glossy white with no trace of the pink tint usually associated with *K. hecuba* nor the "touches of brown" found on *K. ianthe*. Very faint spiral lines begin to appear on the fifth whorl. The characteristic sculpture of the adult *K. hecuba* or *K. ianthe* is not apparent.

Fig. 41. *Kylix* sp. size: 9.0 mm long

Globidrillia micans (Hinds, 1843)
Figure reference: Keen #1630
Lot data: G-247S, 9 adult specimens 6.0 to 9.7 mm long
Collecting data: Station A

Miraclathurella bicanalifera (Sowerby, 1834)
Figure reference: Keen #1719
Lot data: G-249S, 1 specimen 21.0 mm long with adult lip
Collecting data: Station D
Range: DuShane & Brennan (1969) extended the northern end of the range from San Luis Gonzaga Bay, Gulf of California (Keen, 1971) to San Felipe.

Compsodrillia albonodosa (Carpenter, 1857)
Figure reference: Keen #1733
Lot data: G-271S, 1 juvenile specimen 8.0 mm long
Collecting data: Station A

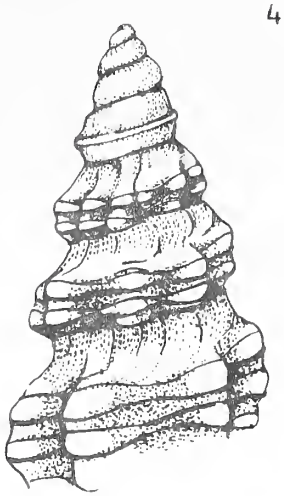


Fig. 42. C. alcestis
size: 5.0 mm long

Compsodrillia alcestis (Dall, 1919)
Figure reference: text figure 42
Lot data: G-271AS, 1 juvenile specimen 5.0 mm long
Collecting data: Station A
Discussion: The illustration of the juvenile (Fig. 42) shows a protoconch of three nuclear whorls, with the first whorl of the teleoconch keeled. The sculpture is developed on the subsequent whorls. DuShane & Brennan (1969) extended the northern range from Guaymas to the San Felipe area.

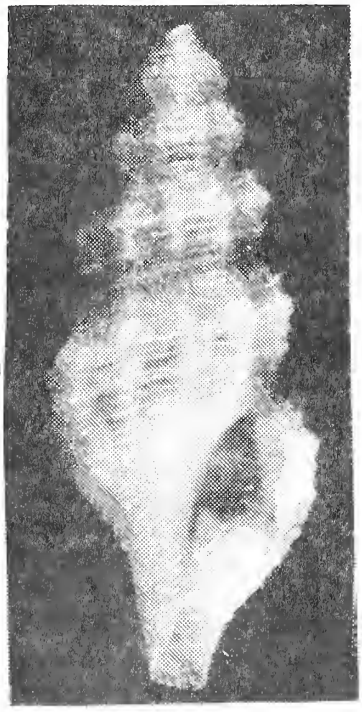


Fig. 43. K. cyrene
size:

Kurtziella antiochroa (Pilsbry & Lowe, 1932)
Figure references: Keen #1788 and Pils. & Lowe 1932
Lot data: G-267S, 2 juvenile specimens 3.0 mm and 4.0 mm long.
Collecting data: Station D
Discussion: To identify these immature Gemmell specimens, we compared them with the paratypes of K. antiochroa (TS555) in the SDNHM collection. The nucleus of 1½ smooth whorls followed by a rounded whorl with axial riblets and spiral threads were consistent features of our juveniles and the paratypes of K. antiochroa. In studying the original reference for K. antiochroa we noted the similarity between our specimens and K. cymatias Pilsbry & Lowe, 1932 (pl.3, fig. 10). We then compared the paratypes of both species (TS 554 and TS 555) and SDNHM lot #22335 of K. cymatias from Puerto Peñasco, Sonora, Mexico. After examining all lots we concur with McLean in Keen (1971) that K. cymatias is a synonym of K. antiochroa.

Kurtziella powelli Shasky, 1971
Figure reference: Keen #1790
Lot data: G-266S, 13 specimens 2.0 to 5.0 mm long
Collecting data: Station D

Kurtziella cyrene (Dall, 1919)
Figure reference: text figure 43
Collecting data: Station G, trawled on shrimpboat 60-80 ft., 11 November 1971
Discussion: This specimen from the Chamizal I collecting trip was given to Bert Draper and specimens from seastars are not now in the Gemmell collection, but comparison material (2 specimens G-266A) from Playa Alicia, San Felipe is available.

Fig. 44. K. arteaga

Kurtzia arteaga (Dall & Bartsch, 1910)
Figure reference: text figure 44 is a reproduction of a Dall & Bartsch (1910) drawing.
Lot data: G-263S, 42 specimens 1.5 to 6.3 mm long
Collecting data: Stations A & C

Pyrgocythara emersoni Shasky, 1971
Figure reference: Keen #1826
Lot data: G-283AS, 2 adult specimens 7.0 mm long
Collecting data: Station E

Pyrgocythara phaethusa (Dall, 1919)
Figure reference: text figure 45
Lot data: G-273S, 5 adult specimens 3.0 to 6.0 mm long
Collecting data: Station G, trawled by shrimp boat in 30 ft., 5 May 1970
Range: McLean in Keen (1971) gives the range as La Libertad, Sonora to the Gulf of Tehuantepec, Mexico. The Gemmell specimens place this species in San Felipe in the northwestern Gulf of California.

Pyramidella adamsi Carpenter, 1864
Figure reference: Keen #1877
Lot data: G-275AS, 1 juvenile specimen 6.0 mm long
Collecting data: Station B

Fig. 45. P. phaethusa
size: 4.0 mm long

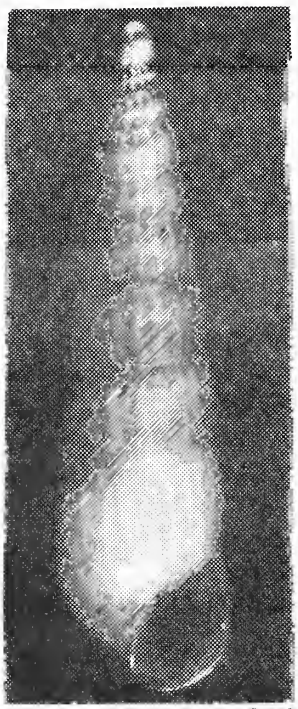


Fig. 46. T. sealei
size: 6.9 mm long

Fig. 47. V. panamica
size: 3.9 mm long

Turbonilla sealei Strong & Hertlein, 1939
Figure reference: text figure 46
Lot data: G-306S, 30 adult specimens 3.0 to 6.5 mm long
Collecting data: Station B
Range: Keen (1971) lists this species from Bahía Honda, Panama. We place the species at San Felipe in the northwestern Gulf of California.

Volvulella cylindrica (Carpenter, 1864)
Figure reference: Keen #2250
Lot data: G-287S, 18 specimens 2.5 to 5.0 mm long
Collecting data: Station G, trawled on shrimpboat from 60 to 80 ft., 11 November 1971

Volvulella panamica Dall, 1919
Figure reference: text figure 47
Lot data: G-294S, 16 specimens 3.0 to 4.5 mm long
Collecting data: Station G, trawled by shrimpboat from 50 ft., 1 April 1973

Acteocina angustior Baker & Hanna, 1927
Figure reference: Keen #2257
Lot data: G-290S, 8 adult specimens 4.0 to 6.0 mm long
Collecting data: Stations B & C

Acteocina carinata (Carpenter, 1857)
Figure reference: text figure 48
Lot data: G-291S, 2 adult specimens 2.2 and 3.1 mm long
Collecting data: Station C
Discussion: In our study of this species we observed the "double carina at the shoulder" stated but not shown in Keen (1971). However, this feature is not mentioned or shown in the Carpenter (1857) original description or in his original figure Tablet 784 (Brann, 1966). It is not apparent either in Keen (1968).

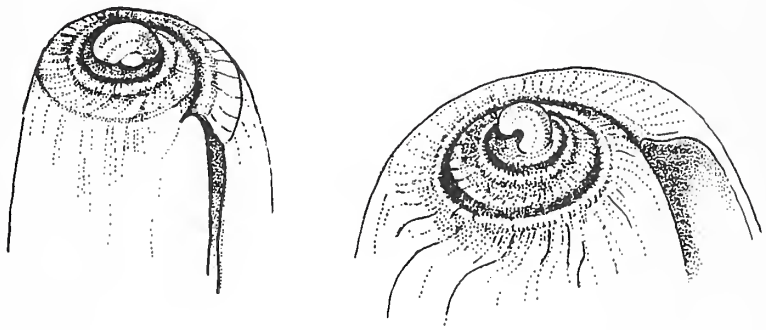


Fig. 48. Acteocina carinata detail of spire and carina

Cylichnella inculta (Gould, 1855)
Figure reference: Keen #2259
Lot data: G-299S, 3 specimens 2.0 to 3.0 mm long
Collecting data: Station C
Discussion: Cylichnella inculta was originally described by Gould in Blake (1855) as Bulla (Tornatina) inculta. This species has been erroneously credited as Gould, 1856 (Gosliner, 1979); Gould, 1856 (Marcus, 1977); Gould & Carpenter, 1857 (Keen, 1971); Gould, 1856 (Oldroyd, 1927). We have included Gould's original description from this obscure publication. "Testa minuta, solidula eburnea elongato-ovalis, longitudinaliter minutessime striata; spira elevata; anfractibus quatuor tabulatis; apertura linearis, octantes, septem longitudines testae adequans, antice dilatata, postice rotundata; labro incurvato; columellâ satis arcuatâ, callossâ uniplicatà. Shell minute, solid, ivory white, elongated-oval, minutely striated longitudinally; spire elevated, consisting of about four tabulated whorls. Aperture about seven-eighths the length of the shell, not attaining the end of the outer whorl, linear, constricted at the middle and somewhat dilated anteriorly, posterior angle rounded; pillar moderately arcuate, usually presenting a well marked fold at the anterior fourth and well coated with enamel."

The generic change from Acteocina in Keen (1971) to Cylichnella given here was based on anatomical studies by Gosliner (1979).

Cylichnella tabogaensis Strong & Hertlein, 1939
Figure references: text figure 49, and Strong & Hertlein (1939)
Lot data: G-304S, 108 specimens from 1.2 to 3.0 mm long
Collecting data: Station A
Lot data: G-304AS, 72 specimens from 1.0 to 3.2 mm long
Collecting data: Station G, trawled on shrimpboat from 60 to 80 ft., 11 November 1971
Range: Keen (1971) lists this species from Panama. Taboga Island, Panama is the type locality. The Gemmell specimens place the species in the

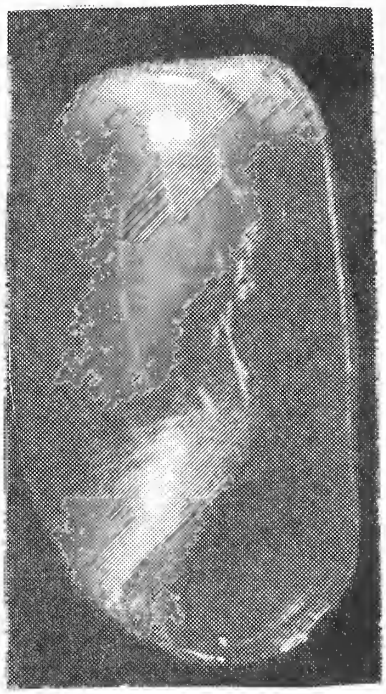


Fig. 49. C. tabogaensis
size: 2.6 mm long

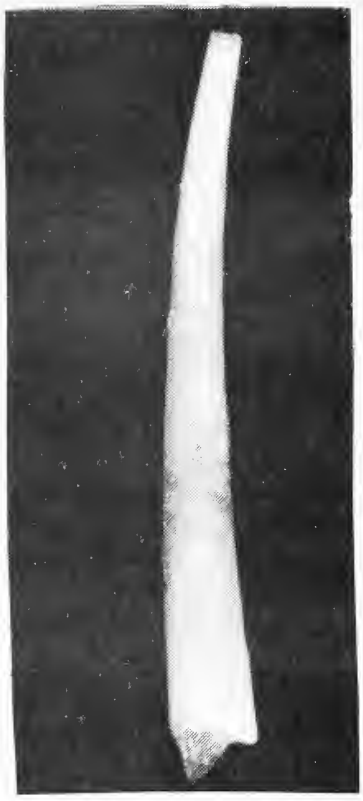


Fig. 50. Dentalium sp.
size: 6.0 mm long

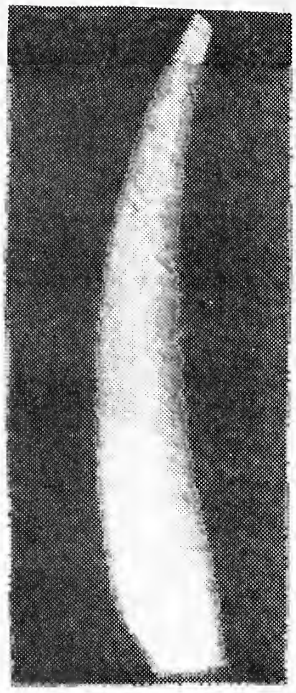


Fig. 51. C. perpusillus
size: 8.0 mm long

northwestern Gulf of California at San Felipe.

SCAPHAPODA

Dentalium sp.
Figure reference: text figure 50
Lot data: G-4955, 3 specimens 7.0 to 12.0 mm long
Collecting data: Station A
Discussion: These specimens were too juvenile to identify.

Dentalium quadrangulare Sowerby, 1832
Figure reference: Keen #10
Lot data: G-4985, 1 partial specimen
Collecting data: Station A

Cadulus perpusillus (Sowerby, 1832)
Figure reference: text figure 51
Lot data: G-4975, 22 adult specimens 5.0 to 9.0 mm long
Collecting data: Station G, trawled on shrimpboat from 60-80 ft.,
11 November 1971

CONCLUDING REMARKS

In our study we found 83 species of mollusks ingested by the seastars Luidia columbia and Astropecten armatus. 51 of these species were gastropods, 29 bivalves, and 3 were scaphopods. Of the 29 bivalve species collected we were unable to identify 3 species, 21 were juvenile, 4 were adult, and in 2 species both juveniles and adults were ingested. Of the 51 species of gastropods listed we were unable to identify 3 species, 12 were juvenile, 11 were adult and in 17 species both adults and juveniles were ingested.

The high percentage of juveniles, some extremely young, made identification difficult. Some of the distinguishing characteristics of the adults are not in evidence in the very young shells. For this reason our observations of various species differ in some respects from the original descriptions.

8 of the species collected were range extensions. The species for which range extensions are given are listed as follows: Nuculana costellata, Tivela argentina, Tellina ulloana, Elephantulum liratocinctum, Muricopsis zeteki, Pyrgocythara phaethusa, Turbonilla sealei, Cylichnella tabogaensis.

Our data infers that where mollusks are available they provide a significant portion of the diet of two seastar species.

ARTISTIC CREDITS

The following is a list of artists' names and the appropriate figure numbers of their drawings and photographs.

D'Attilio, Anthony: 10, 11.
Draper, Bert: 20, 24, 29, 38, 43, 46, 47, 49, 51.
Gemmell, Joyce: Cover design, 13a, 13b, 17, 18a, 18b, 18c, 21, 25, 30, 32, 34, 42, 48.
Mulliner, David K.: 8, 9, 12, 14, 16, 19, 22, 23, 26, 27, 28, 31, 35, 39a, 39b, 40, 45, 50.
Myers, Barbara W.: 3a, 3b, 4a, 4b, 5, 6, 7, 15, 36, 37, 41.

ACKNOWLEDGMENTS

During the preparation of this report we have had the enthusiastic support of Dr. Hans Bertsch, curator of the Department of Marine Invertebrates in the San Diego Natural History Museum. His assistance in finding work space for us and housing the Gemmell collection is most greatfully acknowledged. We wish to thank Jules Hertz who had the initial idea for the project and who encouraged us to begin work on these small mollusks; also for his additional suggestions, support, and editorial review of the manuscript. We especially thank Anthony D'Attilio, our constant mentor, under whose guidance the project gained momentum and scope and who was always ready to offer support and encouragement. We also thank him for his critical review of the text. A special thanks to David K. Mulliner, FESTIVUS staff photographer, without whose willing assistance the illustration of the majority of the minute specimens would not have been possible. We would like to thank Mr. Bert Draper for allowing us to use his fine photographs. Mrs. Judy Dyer and Mrs. Carol Barsi, Museum librarians, greatly aided us in locating numerous older works needed in our study and we thank them for their help. We appreciate the help of Dr. James H. McLean, Mr. Gale Sphon and Mr. Patrick LaFollette of the Los Angeles County Museum for making their collection available to us.

LITERATURE CITED

Abbott, R. Tucker. 1974. American Seashells, Second Edition. Van Nostrand Reinhold. 663 pp. 24 pls.

Adams, C.B. 1852. Catalogue of shells collected at Panama, with notes on synonymy, station and habitat. Ann. Lyceum Nat. Hist. New York. Vol. 5:229-549. (Reprint Edition Vol. 5:334 pp.).

Baker, Fred and G. Dallas Hanna. 1927. Marine Mollusca of the Order Opisthobranchiata. Proc. Cal. Acad. Sci. Ser. 4, Vol. 16(5):123-135. pl. 4.

Barnes, Robert D. 1974. Invertebrate Zoology, Third Edition. W.B. Saunders Co. 870 pp.

Bartsch, Paul. 1910. The West American mollusks of the genus Alaba. Proc. U.S.N.M. Vol. 39(1781):153-156. 4 figs.

1911. The Recent and fossil mollusks of the genus Alabina from the west coast of America. Proc. U.S.N.M. Vol. 39(1790):409-418. 2 pls. 13 figs.

1920. The Caecidae and other marine mollusks from the northwest coast of America. Jour. Wash. Acad. Sci. Vol. 10(20):565-572.

1928. New marine mollusks from Ecuador. Jour. Wash. Acad. Sci. Vol. 18:66-75. 16 figs.

Berry, S. Stillman. 1957. Notices of new eastern Pacific Mollusca.-- I. Leaflets in Malacol. vol. 1, (14): 78.

1958. Notices of new eastern Pacific Mollusca.-- II. Leaflets in Malacol. vol. 1, (15):85.

Blake, William P. 1855. Description of the Fossils and Shells collected in California. Appendix to the Preliminary Geological Report of William P. Blake, in Explorations and Surveys for a railroad route... Washington, D.C., U.S., House of Representatives, Doc. 129. 33rd Congress, 1st session. Art. 2:22-28. A.A. Gould. Catalogue of Shells collected in California by W.P. Blake, with descriptions of the new species.

Boss, Kenneth J. 1966. The subfamily Tellininae in the western Atlantic. Parts I and II. Johnsonia. Vol. 4(45 & 46):217-344. pls. 127-163.

Brann, Doris. C. 1966. Illustrations to "Catalogue of the collection... by Philip P. Carpenter." Paleo. Res. Inst. Ithaca, N.Y. 111pp. 56 pls.

Bratcher, Twila. 1979. Taxonomic changes in eastern Pacific Terebridae, with the description of a new species. Veliger. Vol. 22(1):61-64. 12 figs.

Broderip, W. J. 1832. Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London for 1832. pp. 124-126.

1835. Characters of new genera and species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London for 1835. pp. 41-47.

Broderip, W.J. and G.B. Sowerby. 1829. Observations on new or interesting Mollusca contained, for the most part, in the Museum of the Zoological Society. Zool. Jour. London. vol. 4:359-379.

Campbell, Bruce. 1961. Four new Panamic gastropods. Veliger. vol. 4(1): 26-28. 1 pl.

Carpenter, Philip P. 1856. Description of new species of shells collected by Mr. T. Bridges in the Bay of Panama and its vicinity, in the collection of Hugh Cuming, Esq. Proc. Zool. Soc. London, for 1855. pp. 159-166.

1857. Catalogue of the collection of Mazatlan shells in the British Museum: collected by Frederick Reigen. Reprinted, Paleo Res. Inst. Ithaca, N.Y. 1967. 552 pp.

1864a. Diagnoses of new forms of mollusks collected at Cape St. Lucas, Lower California by Mr. J. Xantus. Ann. Mag. Nat. Hist. ser. 3, vol 13, pp. 311-315.

1864b. Supplementary report on the present state of our knowledge with regard to the Mollusca of the west coast of North America. Rep. Brit. Assoc. Adv. Sci. for 1863, pp. 517-686.

Clark, Ailsa M. 1953. Notes on Asteroids in the British Museum (N.H.). Bull. Brit. Mus. Zool. 1:379-412. 6 pls.

Conrad, T. A. 1863. Proc. Acad. Nat. Sci. Philadelphia for 1862. p. 572. (not seen).

Dall, William Healey. 1900. Synopsis of the family Tellinidae and of the North American Species. Proc. U.S. Nat. Mus. vol. 23(1210): 285-326, pls. 2-4.

1908. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico and in the Gulf of California...XIV. The Mollusca and Brachiopoda. Bull. Mus. Comp. Zool. Harvard, vol. 43(6):205-487. pls. 1-22.

1913. Diagnoses of new shells from the Pacific Ocean. Proc. U.S. Nat. Mus. vol. 45(2002):587-597.

1915. Notes on the Semelidae of the west coast of America, including some new species. Proc. Acad. Nat. Sci. Phila. vol. 67:25-28.

1917. Summary of the mollusks of the family Alectrionidae of the west coast of America. Proc. U.S. Nat. Mus. vol. 51(2166):575-579.

1919a. Descriptions of new species of mollusks of the family Turritidae from the west coast of America and adjacent regions. Proc. U.S. Nat. Mus. vol. 56(2288):1-86. 24 pls.

1919b. Descriptions of new species of Mollusca from the north Pacific Ocean in the collection of the United States National Museum. Proc. U. S. Nat. Mus. vol. 56(2295):293-371.

Dall, William Healey and Paul Bartsch. 1909. A monograph of West American Pyramidellid mollusks. Bull. U.S. Nat. Mus. 68:1-258. 30 pls.

1910. New species of shells collected by Mr. John Macoun at Barkley Sound...British Columbia. Canada Dept. of Mines, Geol. Surv. Branch Mem. 14-N:5-22. 2 pls.

Deshayes, G.P. 1839. Nouvelles especes de mollusques, provenant des cotes de la Californie, du Mexique...Revue zoologique, par la Societe Cuvierienne. vol. 2:356-361. (plates in Magasin de Zool.: 1840, pls 12-20; 1841, pls 25-30, 34-38).

1857. Description d'especes nouvelles du genre Terebra. Jour. Conch. vol. 6, pp. 65-102, pls 3-5.

Döderlein, Ludwig. 1917. Die Asteriden der Siboga Expedition. Die Gottung Astropecten und Stammesgeschichte. Monog.46a. 191 pp. 17 pls.

1920. Die Asteriden der Siboga Expedition. Die Gottung Luidia. Monog. 46b. pp. 193-293. pls. 18-20.

Duclos, P. L. 1835. Histoire naturelle...pts. 1-2. pls 1-12 (not seen)

DuShane, Helen and Ellen Brennan. 1969. A preliminary survey of mollusks for Consag Rock and adjacent areas, Gulf of California, Mexico. Veliger. vol. 11(4):351-363. 1 map.

Fell, H. B. 1963. The Phylogeny of sea-stars. Roy. Soc. London. Phil. Trans. Ser. B. 246:381-435.

Fischer, Paul. 1880-1887. Manuel de Conchyliologie... Paris. 1369 pp. 1138 text figs.

Fisher, Walter K. 1911. Asteroidea of the north Pacific and adjacent waters. Pt. 1. Bull. U.S. Nat. Mus. vol. 76. 419 pp. 122 pls.

1930. Asteroidea of the north Pacific and adjacent waters. Pt. 3. Bull. U. S. Nat. Mus. vol. 76. 355 pp. 93 pls.

Forbes, Edward. 1839. On the Asteriadae of the Irish Sea. Mem. Wernerian Soc. Edinburgh. 8(1):114-129. 2 pls. (not seen).

Gemmell, Joyce. 1969. Dredging by shrimpboat. News w. Assoc. Shell Clubs. (S.D. Shell Club). vol. 10(4):15-17.

1975. Shrimpboat shelling. Festivus. vol. 6(6): 34-35. 1 pl.

Gosliner, Terrence. 1979. A review of the systematics of Cylichnella Gabb (Opisthobranchia: Scaphandridae). Nautilus vol. 93(2-3):85-92.

Gould, A.A. 1853. Descriptions of shells from the Gulf of California and the Pacific coasts of Mexico and California. Boston Jour. Nat. Hist. vol. 6. pp. 374-408. pls 14-16.

1855. See Blake, W. P.

Gould, A.A. and P.P. Carpenter. 1856. Descriptions of shells from the Gulf of California and the Pacific coasts of Mexico and California. Pt. II. Proc. Zool. Soc. London, pt. 24, pp. 198-208.

Gray, John E. 1839. Molluscous animals and their shells. In F. W. Beechey, The zoology of Capt. Beechey's voyage... to the Pacific and Behring's Straits in his Majesty's ship Blossom...London. pp. 103-155. pls 33-44. (not seen).

1840. A synopsis of the genera and species of the class Hypostoma (Asterias, Linnaeus). Ann. & Mag. Nat. Hist. 6:175-184.

Hanley, Sylvanus. 1844. Descriptions of new species of the genus Tellina chiefly collected by H. Cuming, Esq., in the Philippine Islands and Central America. Proc. Zool. Soc. London. vol. 13. pp. 68-72.

1845. Descriptions of six new species of Donax in the collection of Hugh Cuming, Esq. Proc. Zool. Soc. London. vol. 13. pp. 14-16.

Hertlein, Leo G. and A. M. Strong. 1940-1951. Eastern Pacific Expeditions of the New York Zoological Society. Mollusks from the west coast of Mexico and Central America. Parts I-X. Zoologica. New York.

Hertlein, Leo G. 1968. Tellina ulloana, a new species from Magdalena Bay, Baja California, Mexico. Veliger. vol. 11(1):80.

Hertz, Carole M. 1979. Observations on the differences between the juvenile and mature Turritella anactor Berry, 1957. Festivus. vol. XI(6):48-49. 3 pls.

Hertz, Jules. 1978. Minute Shells. Festivus. vol. X(5):40. 2 figs.

1979. Minute Shells. Festivus. vol. XI(1):2-3. 6 pls.

Hinds, R. B. 1843. On new species of Pleurotoma, Clavatula and Mangelia. Proc. Zool. Soc. London. pp. 36-46.

1844-45. The Zoology of the voyage of H.M.S. Sulphur, under the command of Capt. Sir Edward Belcher during the years 1836-42. Mollusca. London. vol. II. pt. 2. pp. 25-48. pls. 8-14.

Hopkins, Thomas S. and George F. Crozier. 1966. Observations on the asteroid echinoderm fauna occurring in the shallow water of Southern California (intertidal to 60 meters). Bull. S. Cal. Acad. Sci. 65(3):129-145.

Hulings, Neil C. and D.W. Hemlay. 1963. An investigation of the feeding habits of two species of seastars. Bull. Mar. Sci. 13:354-359.

Hunt, O.D. 1925. The food of the bottom fauna of the Plymouth fishing grounds. Mar. Biol. Assoc. U.K. Jour. 13:560-599. 2 pls.

Iredale, Tom. 1931. Australian Molluscan notes. No. 1. Rec. Aust. Mus. Sidney. vol. 18(4):201-235. 3 pls.

John, D. 1948. Notes on asteroids in the British Museum. (Nat. Hist.)-- the species of Astropecten. Novitates Zoologicae. 42:485-508. 4 pls.

Keen, A. Myra. 1958. New mollusks from tropical west America. Bull. Amer. Paleo. Paleo. Res. Inst. Vol. 38(172):239-255. pls. 30,31.

1968. West American mollusk types in the British Museum (Nat. Hist.)IV. Carpenter's Mazatlan Collection. Veliger. Vol. 10(4):389-439. pls. 55-59. 171 text figs.

1971. Sea shells of tropical West America, Second edition. Stanford Univ. Press. 1064 pp.

Lamarck, J.B.P.A. de M. de. 1811. (Suite de la) Détermination des espéces de mollusques testacés: continuation du genre Porcelaine et des genres Ovule, Tarriere, Ancillaire, et Olive. Ann. Mus. hist. nat. Paris. vol. 16. pp. 300-338.

Lowe, Herbert N. 1935. New marine mollusca from west Mexico, together with a list of shells collected at Punta Peñasco, Sonora, Mexico. Trans. San Diego Soc. Nat. Hist. vol. 8(6):15-34. 4 pls.

Lutken, C.F. 1859. Vidd. Medd. p. 40. (not seen).
1871. Vidd. Medd. p. 288. (not seen).

Marcus, Eveline d. B-R. 1977. On the genus Tornatina and related forms. Supplement 2, Jour. Moll. Stud. 35 pp. 88 figs.

Marincovich, Louie. 1977. Cenozoic Naticidae (Mollusca:Gastropoda) of the northeastern Pacific. Bull. Amer. Paleo. vol. 70(294):169-494. pls.17-42.

Megerle von Mühlfeld, J. D. 1811. Entwurt eines neuen Systems der Schalthiergehause. Gesellschaft Naturforschender Freunde. Berlin. Magazin 5. (not seen).

Moore, R. C. 1966. Treatise on invertebrate Paleontology. Part U. Echinodermata. 3(1) 366 pp. 271 figs. (Durham, J.W. et. al.).

Müller, J. and F. H. Troschel. 1842. System der Asteriden. Braunschweig. 134 pp. 12 pls. (not seen)

Oldroyd, Ida. 1927. Marine shells of the west coast of North America. vol. II(1). 297 pp. 29 pls.

Olsson, Axel A. 1956. Studies on the genus Olivella. Proc. Acad. Nat. Sci. Phila. Vol.CVIII:155-226. pls. 8-16.
1961. Mollusks of the tropical eastern Pacific-Panamic Pacific pelecypods. Paleo. Res. Inst. 574 pp. 86 pls.

Orbigny, Alcide d'. 1846. Mollusques. In R. Sagra, Histoire physique, politique, et naturelle de l'Ile de Cuba. 2 vols and atlas (not seen).

Philippi, R. A. 1845. Diagnosen einiger Conchylien. Archiv. Naturg. yr. 11, vol. 1, pp. 50-71. (not seen)
1846. Conchylien-Arten, Zeits. Malak. (not seen).

Phillips, Ted. 1970. Notes on predation of the asteroid genus Luidia on Donax navicula at Playa Almejas, Baja California del norte, Mexico.. Tabulata. p. 16. (July).

Pilsbry, Henry A. and H.N. Lowe. 1932. West Mexican and Central American mollusks collected by H.N. Lowe. Proc. Acad. Nat. Sci. Phila.. Vol. LXXXIV:33-144. 17 pls.

Pilsbry, Henry A. and Axel A. Olsson. 1945. Vitrinellidae and similar gastropods of the Panamic province, Part 1. Proc. Acad. Nat. Sci. Phila. Vol. 97:249-278. pls. 22-30.

Recluz, C.A. 1844. Description of new species of Navicella, Neritina, Nerita and Natica, in the cabinet of Hugh Cuming, Esq. Proc. Zool. Soc. London for 1843. pp. 197-214.

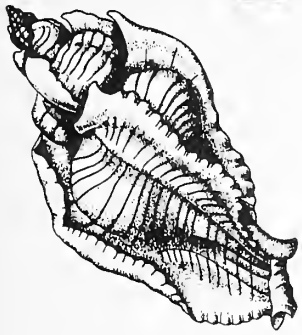
Reeve, Lovell. 1843-78. Conchologia iconica: or illustrations of the shells of molluscous animals. London. vols. 1-15.

Robinson, Margaret K. 1973. Atlas of monthly mean sea surface and sub-surface temperatures in the Gulf of California, Mexico. S.D.S. Nat. Hist. Mem. 5. 19 pp. 90 figs.

Shasky, Donald R. 1971. Ten new species of tropical eastern Turridae. Veliger. Vol. 14(1):67-72. 10 figs.

Sherborn, Charles. 1922. Index animalium. Ser. 2. Pts. 1-33.
Sowerby, George B. 1832-33. Characters of new species of Mollusca and Conchifera, collected by Mr. Cuming . Proc. Zool. Soc. London pp. 113-120, 173-179, 194-202.
1833-34. Characters of new species of Mollusca and Conchifera. Ibid. pp. 16-22, 34-38, 134-139.
1835. Characters and observations on new genera and species of Mollusca and Conchifera collected by Mr. Cuming. Ibid. pp. 21-23, 41-47, 109-110.
Sowerby, George B. Jr. 1865-78. Conchologia iconica: or illustrations of the shells of molluscous animals. London. vols. 15-20.
Strong, A. M. and Leo G. Hertlein. 1939. Marine mollusks from Panama collected by the Allan Hancock Expedition to the Galapagos Islands, 1931-32. Allan Hancock Foundation Pub. of Univ. of S. Calif. vol. 2(12):177-245. pls. 18-23.
Thomson, Donald A. 1974. 1974 Tide calendar for the northern Gulf of California. Dept. Bio. Sci., Univ. of Ariz.
Tryon, George W. 1897-1898. Manual of Conchology. Vol. XVII. 348pp.
Valenciennes, Achille. 1832. I. Coquilles marines bivalves de l'Amérique Equinoxiale, recueillies pendant le voyage de MM. de Humboldt et Bonpland. (not seen).
Wells, Harry W., Mary J. Wells and I.E. Gray. 1961. Food of the seastar Astropecten articulatus. Biol. Bull. 120(2):265-271.
Wood, W. 1828. Supplement to the Index testaceologicus; or a catalogue of shells, British and foreign. London. 59 pp. 8 pls.
Woodring, Wendell P. 1928. Miocene mollusks from Bowden, Jamaica. Part II. Gastropods and discussion of results. Carnegie Inst. Wash. 564 pp. 40 pls

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII April 1980 No. 4

SEE YOU AT THE AUCTION/POTLUCK!!
(There is no regular meeting this month).
Date: April 26, 1980 Time: 6:00 P.M. - ? Place: The Bradners'home
For directions and details, see map on last page of this issue.

If you have shells for the Auction, call a board member to arrange pickup.

CONTENTS

In Memoriam..... 57
NASSARIUS INSCULPTUS (Carpenter, 1864)
HERTZ, J..... 58
Club News..... 60
ACTINOTROPHON ACTINOPHORUS (Dall, 1889)
D'ATTILIO, A..... 61
Editor's Note..... 63
Membership roster and map for detaching

IN MEMORIAM

The San Diego Shell Club is saddened by the loss of three of its friends; Susan Clover, daughter of Joyce and Phillip Clover; Mae Dean Richart; and Emma Rose West. We offer our condolences to their families and we will miss them.

Susan Clover, as a young child, often accompanied her parents on field trips to San Felipe where Club members interacted as a large family.

Emma Rose and Art West were long time local members before moving to northern California several years ago. Many Club members recall pleasant moments spent in their combination home and shop in Chula Vista.

Mae Dean Richart was an active local member for many years who shared her time and enjoyment of shells with schoolchildren in the local elementary schools near her home. Mae Dean felt a bond to the San Diego Shell Club and very generously bequeathed to it both her shell collection and library. Most all of her books will enrich the Club library and are listed below. Her shell collection will be part of the auction in May and proceeds from its sale will go to support the scientific endeavors of the Club.

BOOKS BEQUEATHED BY MAE DEAN RICHART TO THE SAN DIEGO SHELL CLUB LIBRARY

AMERICAN SEASHELLS, R. Tucker Abbott. 1958.
ANIMALS WITHOUT BACKBONES. Ralph Buchsbaum. 1938.
AUSTRALIAN SHELLS. Joyce Allan. 1962.
BETWEEN PACIFIC TIDES. Ricketts & Calvin. 1956 (3rd. ed.)
BULLETIN 112, U.S.N.M. W.H. Dall. 1921.
COMMON MARINE BIVALVES OF CALIFORNIA. John E. Fitch. 1953.
FIELD GUIDE TO THE SHELLS OF THE ATLANTIC AND GULF COASTS. Percy Morris. 1973.
FOSSILS. Frank H.T. Rhodes et al. 1962
FOSSILS. (magazine)
HANDBOOK OF PALEONTOLOGY FOR BEGINNERS AND AMATEURS: PT. I, THE FOSSILS.
Winifred Goldring. 1960.
INDO-PACIFIC MOLLUSCA, Vol. I (5) FAMILY TURRIDAE IN THE INDO PACIFIC.
A.B. Powell. 1964.
Vol. II (6) TRIDACNIDAE IN THE INDO-PACIFIC.
Joseph Rosewater. 1965.
IN SEARCH OF ADAM. Herbert Wendt. 1956.
MARINE SHELLS OF SOUTHERN CALIFORNIA. James H. McLean. 1969.
MARINE SHELLS OF THE PACIFIC, VOL. I. Walter O. Cernohorsky. 1967.
MOLLUSCS: AN INTRODUCTION TO THEIR FORM AND FUNCTIONS. J.E. Morton. 1960.
SEA SHELLS OF TROPICAL WEST AMERICA, (1st ed) A. Myra Keen. 1958.
SEA SHELLS OF TROPICAL WEST AMERICA, 2ND EDITION. A. Myra Keen. 1971.
SEASHELLS OF THE WORLD (Golden Guide) R. Tucker Abbott. 1962
SEASHORE LIFE OF THE SAN FRANCISCO REGION AND THE COAST OF NORTH AMERICA.
Joel W. Hedgepath. 1962.
SEASHORE LIFE OF SOUTHERN CALIFORNIA. Sam Hinton. 1969.
SHELLS OF THE WESTERN PACIFIC IN COLOR. Vols. I & II. Kira & Habe. 1962 & 1964.
SHELLS OF THE AUSTRALIAN SEASHORE (sm. paperback) D.R. McMichael. 1962.
THE SHELL MAKERS. Alan Solem. 1974.
TRITON, HELMET AND HARP SHELLS. Maxwell Smith. 1948.
WEST COAST SHELLS. Keep & Baily. 1935.
WONDERS OF BARNACLES. Ross & Emerson. 1974.
VELIGER. Vols. I - 13. (missing Vol. 5, No. 1 and Vol. 9, No. 3.)
Includes 3 supplements
WESTERN SOCIETY OF MALACOLOGISTS. ANNUAL REPORTS 1968-1979.
AMU -ANNUAL REPORT. 1963, 1966-1969. Bulletin for 1975.

NASSARIUS INSCULPTUS (CARPENTER, 1864)

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Among some small shells recently obtained from Loyal J. Bibbey were 51 specimens of Nassarius insculptus (Carpenter, 1864). The material had been trawled by Ronnie Nicols in nets in depths of 300 to 450 feet on the south side of the La Jolla Trench (off San Diego, California) from January to June 1979. Although less than one inch (25.4 mm) in length, this species does not fall into the "minute" category. For the 51 specimens reported here, the range in length was from 7.3 to 20.6 mm and the range in width was from 4.3 to 12.3 mm.

Fig. 1. Apertural view of smooth form of Nassarius insculptus (Carpenter, 1864)
Length: 18.5 mm; Diameter: 11.0 mm
Approx. magnification: 4.3X

Figure 1 is an apertural view of the typical form of N. insculptus. This is a thick and solid shell with fine and regularly spaced spiral cords crossed by a few low axial ribs, especially on the spire. The lip is strongly reflected. The color is generally tan or light brown, but the aperture is white. In some shells the body color is almost creamy.

Dall (1917) named a varietal form, i.e. Alectrion insculptus, new variety eupleura Dall. "In this form the axial ribs, which in the type are only indicated at the suture, are prolonged over the periphery of the whorl to the base. It has been collected from San Simeon, California, to Cerros Island. (Cat. No. 209046, U.S.N.M.)." Grant and Gale (1931) state "The form eupleura is an individual variation of no taxonomic value." Abbott (1974) also considers N. eupleura a synonym of N. insculptus. To my knowledge the varietal form eupleura has not been previously figured.

Hertlein and Strong (1951) name and figured Nassarius insculptus gordanus. They distinguished their new form from the typical N. insculptus

and the subspecies N. insculptus eupleura as follows: "The present form also has the axial sculpture quite distinct on the last whorl but the spiral grooves are quite strong over the entire surface, particularly so on the sloping shoulders of the whorls. The shell is darker brown and ranges much farther south than the others which have not been reported south of Cedros Island." Keen (1971) put N. insculptus gordanus in synonymy to N. insculptus (Carpenter, 1864) and stated the variant also occurs offshore in southern California.

Fig. 2. Apertural view of ribbed form of N. insculptus
Length: 16.3 mm; Diameter: 10.0 mm
Approx. magnification: 4.3X

Fig. 3. Dorsal view of ribbed form of N. insculptus

Figures 2 and 3 are apertural and dorsal views of one of the shells trawled from the south side of the La Jolla Trench. It appears to meet Dall's description of the eupleura form. Of the 51 trawled specimens, 32 were of the smooth form and 19 had various amounts of heavy axial sculpture on the body whorl. Of the 19 ribbed specimens, 6 had ribbing that extended the full length of the body whorl and uniformly around the whorl similar to the specimen shown in Figures 2 and 3. The remaining ribbed specimens had full length ribs over only part of the body whorl or had ribs only on the posterior portion of the body whorl.

This wide variation in axial sculpture in a large lot of specimens from a single location indicates that this feature has no taxonomic value. Sculptural polymorphism in Nassarius is well known. Roth (1979) notes the well-known dimorphism in Nassarius mendicus (the so-called formae cooperi and mendicus, sensu stricto) as well as analogous dimorphism in Nassarius fossatus.

Nassarius perpinquis (Hinds, 1844) is a shallow water eastern Pacific species which most closely resembles the deep water Nassarius insculptus. It too shows some sculptural dimorphism. In addition to the normal fine cancellate type sculpture, I have obtained specimens from the Entrance Channel in San Diego which occasionally have heavy axial ribbing on the body whorl in addition to the cancellate sculpture. I believe that this type of

sculptural polymorphism can likely be found when examining a large lot of any of the species of Nassarius from the eastern Pacific.

I am indebted to Loyal J. Bibbey for the lot of N. insculptus and to S. "Bob" Naber for the photography.

Literature Cited

Abbott, R. Tucker. 1974. American Seashells, Second Edition. Van Nostrand Reinhold. 663 pp., 24 pls.

Dall, W. H. 1917. Summary of the mollusks of the family Alectrionidae of the west coast of America. Proc. U.S.N.M. Vol. 51(2166):575-579. (Jan. 15)

Grant, U.S.,IV, and H.R. Gale. 1931. Catalogue of the marine Pliocene and Pleistocene Mollusca of California and adjacent regions. Mem. S.D.S.N.H. Vol. 1. pp. 1-1036, 15 figs., pls. 1-32 (Nov. 3).

Hertlein, L.G. and A.M. Strong. 1951. Eastern Pacific expeditions of the New York Zoological Society. Mollusks from the west coast of Mexico and Central America. Pt. X. Zoologica. New York. pp. 67-120. pls. i-xi. (Aug. 20).

Keen, A. Myra. 1971. Sea shells of tropical West America, Second Edition. Stanford Univ. Press. 1064 pp.

Roth, Barry. 1979. Late Cenozoic marine invertebrates from northwest California and southwest Oregon. PhD Dissertation, Dept. Paleontology, Univ. California, Berkeley. 807 pp.

FROM THE MINUTES - MARCH 20, 1980

CAROL BURCHARD

President Sandie Seckington called the meeting to order at 7:45 P.M. New members and guests were introduced following which Don Pisor gave a slide presentation on several of his shelling expeditions. Slides were shown of collecting trips in the Barbados, Taiwan and the Philippines. Don had the opportunity to view the Victor Dan and Guerrera collections and we were treated to pictures of these enormous collections. A most interesting series of slides dealt with a shell jewelry making factory in the Philippines which is completely run by the severely handicapped. Don's eye for the out-of-the-ordinary made this presentation especially enjoyable.

After a refreshment break, the business meeting was begun. Lynn Lindebrekke volunteered to be the Botanical Garden Foundation Representative. The April Auction/Potluck was discussed and a food signup list passed. The Club viewed slides of last September's Shell Club party.

Bill Perrin won the door prize. The meeting was adjourned at 9:15 P.M.

FOR YOUR INFORMATION

1. The AMU annual meeting will be held July 19-25, 1980 at the Executive Inn in Louisville, Kentucky. For information on reservations and/or program contact Pres. Sandie Seckington.

2. The Botanical Garden Foundation Annual Plant Sale will be held on May 31 and June 1 at the Casa Del Prado Patio. Club members will be asked to donate plants for the Sale. Please prepare your cuttings to help support the Foundation. Further details will be announced at the May meeting.

3. Our speaker at the May meeting (May 15) will be Sam Hinton. Save the date!!!

ACTINOTROPHON ACTINOPHORUS (DALL, 1889)

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

This interesting species is a deep water trophon from the tropical Caribbean, the sole representative of the monotypic genus Actinotrophon Dall, 1902. The species has always been one much desired by those collectors whose concept of the species is probably based on the size of the enlarged illustration of the type. However, specimens of this species are less than 20 mm in length.

Dall's description is adequate to describe the species. In the text he draws attention to the siphonal fasciole with its terminal portions of older canals. The original figure by Dall shows the development of much longer arching spines than the specimen illustrated in this paper.

The specimen figured here in Figure 1 is about 15 mm and is a fraction less than the type of 17 mm. The present specimen also differs in some minor quantitative details besides the length of the shoulder spines. It has a pale brown color characteristic of most trophons, and the polished protoconch has about 1½ whorls.

The species was described with several binomina. Dall (1889:206) wrote in the text Boreotrophon actinophorus, but used Trophon? actinophorus with the plate figure explanation. Subsequently Dall (1902) made this species the type of a new taxon, Actinotrophon.

ACKNOWLEDGMENTS

The specimen studied was trawled off St. James Island, Barbados B.W.I. in 140 fathoms. Mr. Don Pisor, who was a member of the expedition but not the owner of the specimen, was kind enough to let me study it.

Dr. Hans Bertsch kindly read the paper.

LITERATURE CITED

Dall, William Healey. 1889. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78) and in the Caribbean Sea (1879-80), by the U.S. Coast Survey steamer "Blake,"... Report on the Mollusca. Part 2. Gastropoda and Scaphopoda. Bull. Mus. Comp. Zool., Vol. 18:1-492. pls. 10-40.

1902. Illustrations and descriptions of new, unfigured, or imperfectly known shells, chiefly American, in the U.S. National Museum. Proc. U.S.N.M. Vol. 24 (1264):499-566. pls. 27-40.

Editor's Note: Mr. D'Attilio has kindly donated the original drawing of Actinotrophon actinophorus to the Club auction on April 26, 1980.

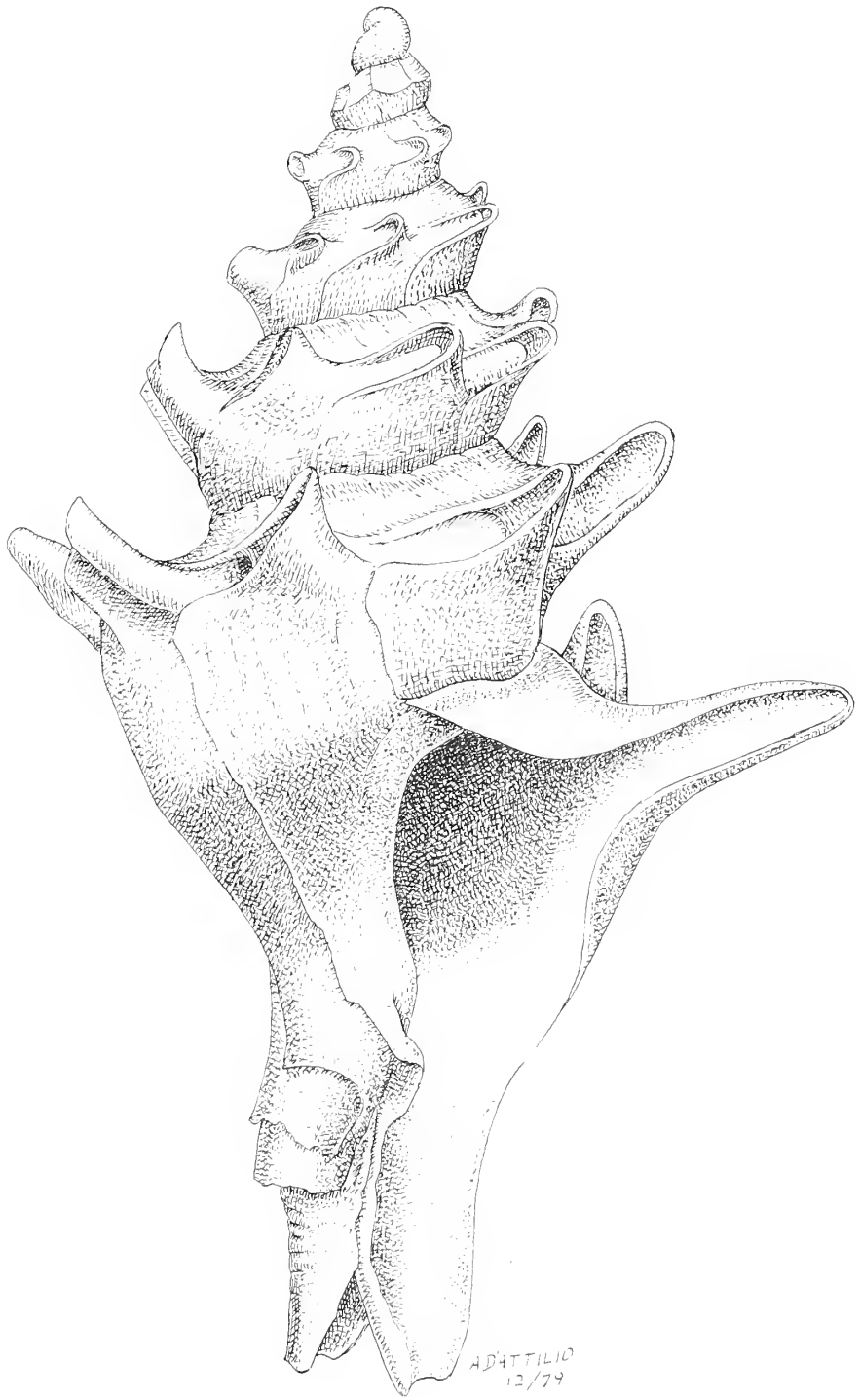


Figure 1. Actinotrophon actinophorus (Dall, 1889)

EDITOR'S NOTE

In SEA SHELLS OF TROPICAL WEST AMERICA, Dr. A. Myra Keen acknowledges, in the preface and text, the authors who contributed to make her work the bulwark of information that it is. It has come to our attention that The FESTIVUS has not always credited these workers and we, of The FESTIVUS, apologize for these inadvertent omissions.

The collation for Keen (1971) which follows is an attempt to publicize and clarify the authorships for the various sections in this enormous work. The list is organized alphabetically according to author with the various sections for each author listed under his/her name. Since this book was not first published in sections, the date 1971 applies to all sections and is not included below.

BRATCHER, TWILA AND ROBERT D. BURCH:.	Family	Terebridae	pp. 670-686
COAN, EUGENE:.....	Superfamily	Atlantacea	pp. 468-472
	Family	Octopodidae	p. 894
COAN, EUGENE AND BARRY ROTH:.....	Family	Marginellidae	pp. 632-638
LANCE, JAMES:.....	Order	Nudibranchia	pp. 820-840
MCLEAN, JAMES H.:.....	Family	Haliotidae	pp. 308-309
		Scissurellidae	p. 309
		Fissurellidae	pp. 309-321
		Patellidae	p. 322
		Acmaeidae	pp. 322-329
		Trochidae	pp. 329-342
		Skeneidae	pp. 342-345
		Liotiidae	pp. 345-349
		Turbinidae	pp. 349-356
		Phasianellidae	pp. 356-359
		Turridae	pp. 686-766
ROBERTSON, ROBERT:.....	Genus	Heliacus	pp. 389-391
TAYLOR, DWIGHT W.:.....	Family	Truncatellidae	pp. 375-376
THORPE, SPENCER:.....	Class	Polyplacophora	pp. 861-882

Note: Dr. Keen advised us that although credit was accidentally omitted, Eugene Coan collaborated in preparation of the section on Geographic Aids, pp. 919-933.

SAN DIEGO SHELL CLUB MEMBERSHIP LIST 1980 4/1/80

Abbott, R Tucker
American Malacologists
P.O. Box 2255
Melbourne, Florida 32901

Adams, Irene & Frank
4139 Taos Dr.
San Diego, Ca. 92117
273-3704

Allan, Patricia & Bruce (son)
3215 La Costa Ave.
Carlsbad, Ca. 92008
436-7022

Baily, Joshua
4435 Ampudia Dr.
San Diego, Ca. 92103

Baker, Elaine C.
P.O. Box 2425
La Jolla, Ca. 92038
456-1866

Bamford, Janet & Wayne
4250 Mt. Henry Ave.
San Diego, Ca 92117
277-8320

Barnes, Laura & Thomas
4234 Arborcrest Dr.
Indianapolis, Ind. 46226

Bertsch, Judi & Hans
11613 La Colina Road
San Diego, Ca. 92131
566-4485

Herzins, Jacqui & Aivars
3592 Captains Galley
Avon Lake, Ohio 44012

Bibbey, Joe
490 Citrus Ave.
Imperial Beach, Ca. 92032
423-5133

Bradner, Marge & Hugh
1867 Caminito Marzella
La Jolla, Cal, 92037
459-7681

Bratcher, Twila
8121 Mulholland Terrace
Hollywood, Ca. 90046
656-4877

Brewer, Blanche & Norval
3614 Roselawn Ave.
San Diego, Ca. 92105
282-0148

British Museum of Natl History
c/o Audrey Meenan, Serials Dept.
Cornwall Road
London, England SW7-5BD

Burch, Beatrice & Thomas
236 Kuuhoa Place
Kailua, Hawaii 96734

Burchard, Carol
c/o 1137 Prospect Street
La Jolla, Ca. 92037
459-6858

Chace, Emery
29661 S. Western Ave. Rm 51
San Pedro, Ca. 90732

Closson, Fred
5750 Amaya Drive #24
La Mesa, Ca. 92041
462-6923

Clover, Phillip
P.O. Box 83
Glen Ellen, Ca. 95442

Covey, Jewel & Philip
3445 No. Romero Rd.
Tucson, Arizona 85705

D'Attilio, Rose & Tony
2415 29th Street
San Diego, Cal 92104
281-9731

Delaware Museum Natl History
Box 3937
Greenville, Del. 19807

Draper, Betram
8511 Bleriot Ave.
Los Angeles, Ca 90045

Dushane, Helen & Joseph
15012 El Soneto
Whittier, Ca. 90605

Evans, Roger
1900 Camino de la Costa #1
Redondo Beach, Ca. 90277

Everson, Gene
100 No. Holly Ln.
Plantation, Fla. 33317

Falkenberry, Christine & Joe
950-16 Arcadia Ave.
Vista, Ca. 92083
724-2108

Faulconer, Heidrun & Phil
P.O. Box 82632
San Diego, Ca 92138
222-8082

Fisichella, Melba
7873 Forrestal Rd.
San Diego, Ca. 92120
583-3696

Fernandes, Francisco
C.P. No 12427
Luanda
Republic Popular Angola
West Africa

Fried, Jeff
3883 Jewel St. #B-17
San Diego, Cal. 92109
270-2498

Gemmell, Joyce
150 So. Anza, Sp 47C
El Cajon, Cal, 92020
447-8004

Goldberg, Richard
49-77 Fresh Meadow Lane
Flushing, New York 11365

Good, Barbara & Frank
3142 Larga Court
San Diego, Cal. 92110
222-5605

Goosen, Dorothy & Bob
59 Bayside Village
Newport Beach, Cal. 92660

Greenberg, Ruth
22762 Pacific Coast Hwy
Malibu, Cal. 90265

Gruppo Malacologico
Livornese Museo Di Provenciale
Storia Naturale, Via F. Crispi, 50
Livorno, Italy 57100

Haigh, Marilyn & Ernest
6533 Orangewood Avenue
Cypress, Cal, 90630

Hanselman, Virginia & George
5818 Tulane Street
San Diego, Cal. 92122
453-3019

Herrmann, Richard
1069 Missouri Street
San Diego, Cal. 92109
483-3643 work

Hertz, Carole & Jules
3883 Mt. Blackburn Ave.
San Diego, Cal. 92111
277-6259

Hogan, Karen
2736 Worden Street
San Diego, Cal, 92110
223-5968

Holiman, Mrs. H.W.
P.O. Box 246
Edinburg, Texas 78539

Janowsky, Dorothy
946 Ralph Avenue
Brooklyn, New York 11236

Khan, Mohammed Moazzam
Institute Marine Biology
University of Karachi
University Rd, Karachi 32, Pakistan

King, Harriett & Frank
859 E. Vista Way
Vista, Cal. 92083
726-3025

King, Suzie
725 Devon Court
San Diego, Cal. 92109
488-6343

King, June & Bob
4269 Hawk Street
San Diego, Cal. 92103
296-0574

Leonard, Fred L.
800 No. 41st Avenue
Hollywood, Fla. 33021

Levine, Anita & Morris
139-62 Pershing Crescent
Jamaica, New York 11435

Lindebrekke, Lynn & Ken
6306 Lake Badin Avenue
San Diego, Cal. 92119
465-1092

Mabry, Billie & Don
6333 La Jolla Blvd, #171
La Jolla, Cal. 92037
459-1087

Macquin, Hazelle
437 Douglas Street
Salt Lake City, Utah 84102

Marriott, Mabel & Claron
1304 E. Avenue I, Sp 18
Lancaster, Cal 93534

Martin, Clifton & Clifford
324 Kennedy Lane
Oceanside, Cal. 92054
757-1528

McGhee, Sandra
8401 W. Sample Rd, #14
Coral Springs, Fla. 33065

Michel, Nola & John
4758 Mt. Cervin Drive
San Diego, Cal, 92117
278-9088

Mulliner, Margaret & David
5283 Vickie Drive
San Diego, Cal. 92109
488-2701

Myers, Barbara & John
3761 Mt Augustus Ave.
San Diego, Cal, 92111
279-9806

Nelson, Susan & John
c/o Ronald Fenton
97 East 6th North
Logan, Utah 84321

Pelton, Don
3775 1/2 38th Street
San Diego, Cal 92105
284-6257

Perrin, Marilyn & Bill
2947 Luna Ave
San Diego, Ca. 92117
272-9342

Pisor, Jeanne & Don
10373 El Honcho Pl.
San Diego, Ca. 92124
279-9342

Poorman, Forrest & Leroy
15300 Magnolia St. Sp55
Westminister, Ca 92683

Purdy, Ruth & Ben
3658 Euclid Ave
San Diego, Ca. 92105
281-6547

Robertson, Marilyn & Wally
c/o 1137 Prospect St.
La Jolla, Ca 92037
459-6858

Rosecrans, Jennie L.
4600 Lamont #4-308
San Diego, Ca. 92109
270-3595

Roworth, Edwin
1301 Windsor Dr.
Cardiff, Ca. 92007
753-3903

Ruhl, Deborah Ann
10669 San Diego Mission Rd. #108
San Diego, Ca. 92108
284-1083

Sage, Patricia & John
1635 Lanoitan Ave
National City, Ca. 92050
477-3264

Salisbury, Richard
Box 4 Naval Station
NAVMACS V2(m) AE SD
SAT/COMM
San Diego, Ca. 92136

Schmeltz, Elaine & Roger
P.O. Box 1060
Alpine, Ca. 92001
445-5561

Schoening, Robert
#571-56-0489
EPMU No. 6 Box 112
Pearl Harbor, Hawaii 96860

Schuler, Sherry & Marty
4810 Cobb Dr.
San Diego, Ca. 92117
270-4875

Seay, Eunice & Jim
3290 San Carlos Dr.
Spring Valley, Ca 92077
466-8994

Seckington, Sandie & George
6314 Lake Badin Dr.
San Diego, Ca. 92119
462-9455

Skoglund, Carol
c/o 3846 E. Highland Ave.
Phoenix, Arizona 85018

Smithsonian Institution
Library-Acquisitions
Acct #901052020I
Washington D.C 20560

Souder, John W.
7845 Michelle Drive
La Mesa, Ca. 92041
462-6166

Stohler, Rudolf
1584 Milvia Street
Berkeley, Ca. 94709

Strigliabotti, Susan
2218 Place Monaco
Del Mar, Ca. 92014
755-3534

Taylor, Kay & Roland
2437 Aster Street
San Diego, Ca. 92109
274-2998

Thompson, Agnes
716 Second St. Sp 178
El Cajon, Ca. 92020
447-0191

Upton, Virginia
Box 2228
Sierra Vista, Arizona 85635

Voso, Helen & Ed
1815 Sweetwater Road
Spring Valley, Ca. 92077
469-8308

Ubaldi, Roberto
Via Delle Case Basse 119
00125, Acilia, Rome, Italy

Webb, Kay & Ray
Rigdon, Marie
501-A Anita Street, Sp 186
Chula Vista, Ca. 92011
420-4900

Weber, Gladys
6439 W. Myrtle Ave, Sp 79
Glendale, Arizona 85301

Williams, Peter N
10457 Shield Court
San Diego, Ca. 92134
569-8156

Woolsey, Jody
3717 Bagley Avenue #206
Los Angeles, Ca. 90034

Wright, Eugenia
2502 E. Valley View Dr.
Phoenix, Arizona 85040

Wright, Jeanne
4905 Twain Avenue
San Diego, Ca. 92120
583-2548

Yeend, Margenette & Arthur
5668 Lord Cecil Street
San Diego, Ca 92122
453-0531

COME TO The AUCTION

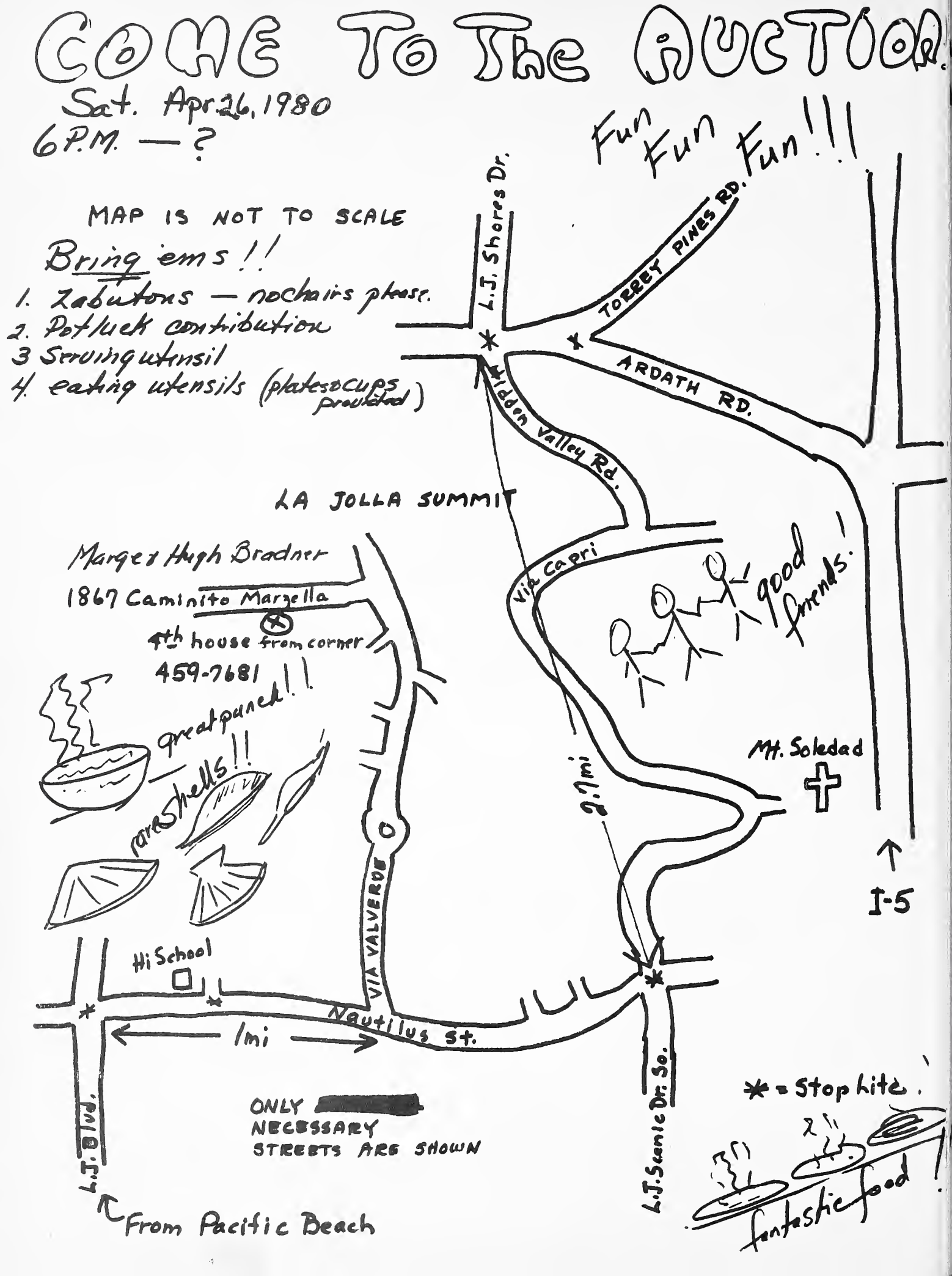
Sat. Apr. 26, 1980
6 P.M. — ?

Fun Fun Fun!!!

MAP IS NOT TO SCALE

Bring ems!!

1. Zabutons — no chairs please.
2. Potluck contribution
3 Serving utensil
4. eating utensils (plates & cups provided)



THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc.,
c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII May 1980 No. 5

PROGRAM: "A Mellow Evening With Sam Hinton"
Sam Hinton, for many years Curator of the Aquarium at Scripps, author of books on marine life, noted folk singer, and delightful speaker will present our May program.

Date: May 15, 1980 Time: 7:30 P.M. Place: Room 104

CONTENTS

Club News..... 65

Minute Shells AMPHISSA UNDATA (Carpenter, 1864)
HERTZ, J..... 66

A Supplementary Note On FAVARTIA DOROTHYAE Emerson & D'Attilio, 1979
D'ATTILIO, A..... 67

TEREBRA of Midway Atoll
SCHMELTZ, R..... 69

THE ANNUAL SAN DIEGO SHELL CLUB AUCTION/POTLUCK

April 26th 1980

CAROL BURCHARD

The annual San Diego Shell Club Auction/Potluck took place at the home of Marge and Hugh Bradner. As always, it was a fantastic social event with fine friends and wonderful food. Over 50 members and guests attended, close to 400 shells were offered for auction. It proved to be a successful evening for the Club.

The cocktail hour began at 6:00 P.M. followed by the potluck dinner. During this time shells to be auctioned were on display. The bidding began at about 7:30 and the auction ended at 1:15 A.M.

The Club expresses many thanks to host and hostess Hugh and Marge Bradner. Much appreciation to Dave Mulliner for his punch. Gratitude to Sandie Seckington, Carole Hertz, and Hugh Bradner for their expertise and good humor as auctioneers. Heartfelt acknowledgment of the donations of Mae Dean Richart.

LIBRARY ADDITIONS

The San Diego Shell Club has been fortunate in being the recipient of book donations by its members. Some books have been sold to raise money for the library and others have been added to it. We thank Joyce Gemmell for the donation of the following books. Those starred have been placed in the Club library.

Field Guide to the Shells of our Atlantic and Gulf Coasts. Percy A. Morris. 1960.

*Field Guide to Shells of the Pacific Coast and Hawaii. Percy A. Morris. 1960.

Marine Shells of the Pacific Northwest. Tom Rice. 1971.

*National Geographic magazine. July, 1949 & March 1969.

Seashells of the World. R. Tucker Abbott & Herbert S. Zim. 1962.

*Seashores. Herbert S. Zim & Lester Ingle.

Seashore Life of the San Francisco Bay Region to the coast of Northern California. Joel W. Hedgpeth. 1962.

Shells are where you find them. Elizabeth Clemons. 1960.

*The Edge of the Sea. Rachel Carson.

*The Sea Beach at Ebb Tide. Augusta Foote Arnold. 1968 ed.

*The Seashore. C.M. Yonge. 1949.

*Van Nostrand's Standard Catalog of Shells. ed. R.L. Wagner & R.T. Abbott. 1964.

CLUB SCIENCE FAIR AWARD

Christina Maria Ternes, aged 15, of Gompers Junior High School won the San Diego Shell Club Science Fair Award for her project, "How do different environmental ions affect hydra?" Club judges, Anthony D'Attilio and Jules Hertz have invited her to present a summation of her project at the June meeting at which time her award will be given to her.

MINUTE SHELLS

AMPHISSA UNDATA (CARPENTER, 1864)

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Another of the small species recently obtained from Loyal J. Bibbey is Amphissa undata (Carpenter, 1864). This moderately common deep-water species was in material trawled by Ronnie Nicols in nets in depths of 300 to 450 feet on the south side of the La Jolla Trench (off San Diego, California) from January to June 1979. The lot of material contained 136 specimens of Amphissa undata, which varied in length from 6 to 14 mm. The 14 mm specimen is very large for the species. Figure 1 shows a typical growth series from this lot.

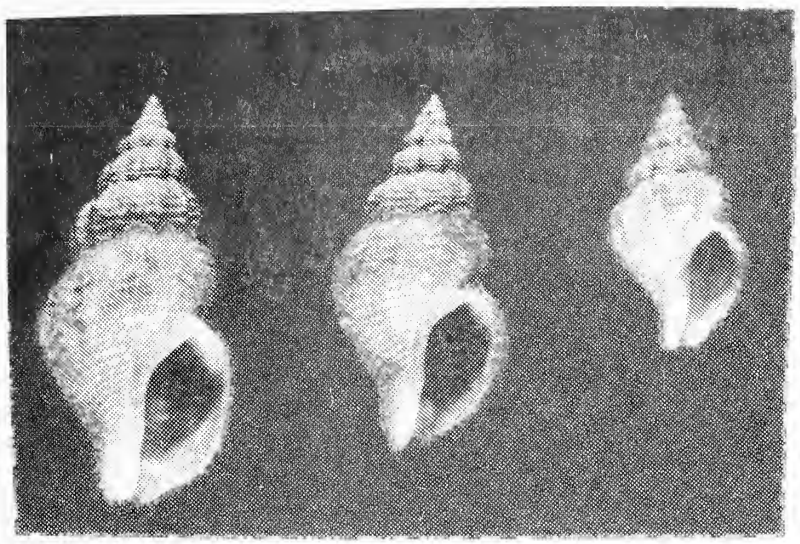


Fig. 1. Growth series of Amphissa undata (Carpenter, 1864)
Magnification: 4.2X; Photograph by David K. Mulliner
Approximate lengths (left to right): 13, 10, and 8 mm.

Amphissa undata is similar to the intertidal and shallow-water species, Amphissa versicolor Dall, 1871. A. undata is light brown, whereas A. versicolor can be found not only in light brown but in gray, orange, dark brown, and various mottled combinations. A. undata is generally a stouter shell with stronger axial ribs, more acute spiral cords, and a higher spire.

ADDITIONS TO THE ROSTER

Burch, Mrs. John C.
1300 Mayfield Rd. Apt. 61-L
Seal Beach, Calif. 90740

Hoffman, Jeffrey
504 Bonair Place
La Jolla, Calif. 92037
454-2403

Snell, Chuck
P.O. Box AC
Trinidad, Calif. 95570

A SUPPLEMENTARY NOTE ON FAVARTIA DOROTHYAE EMERSON & D'ATTILIO, 1979

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Further study of a series of Favartia dorothyae from the type locality received subsequent to the publication of the species reveals some additional morphological details. In more than 20 specimens studied, the shell was found to be entirely colored, ranging from shades of pink to red, orange, and rarely yellow. Within the outer lip there are from 8 to 10 strong lirae and often three weakly raised denticles on the lower portion of the columella. Mature specimens having 6 postnuclear whorls range from 11 to 15 mm long. Figures 1 and 2 show a mature specimen 15 mm in length from Punta Engano, Cebu (Mactan Island), Philippine Islands.

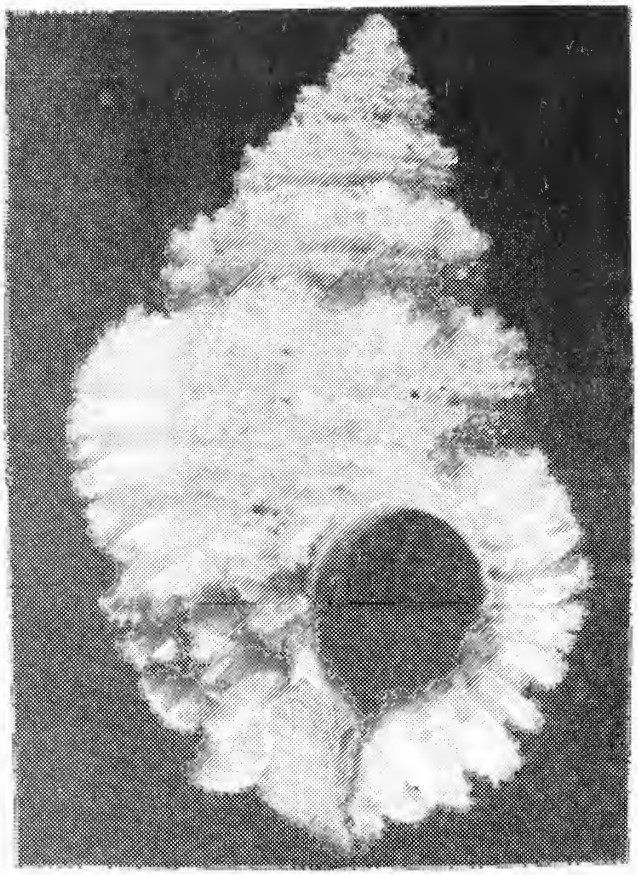


Fig. 1.

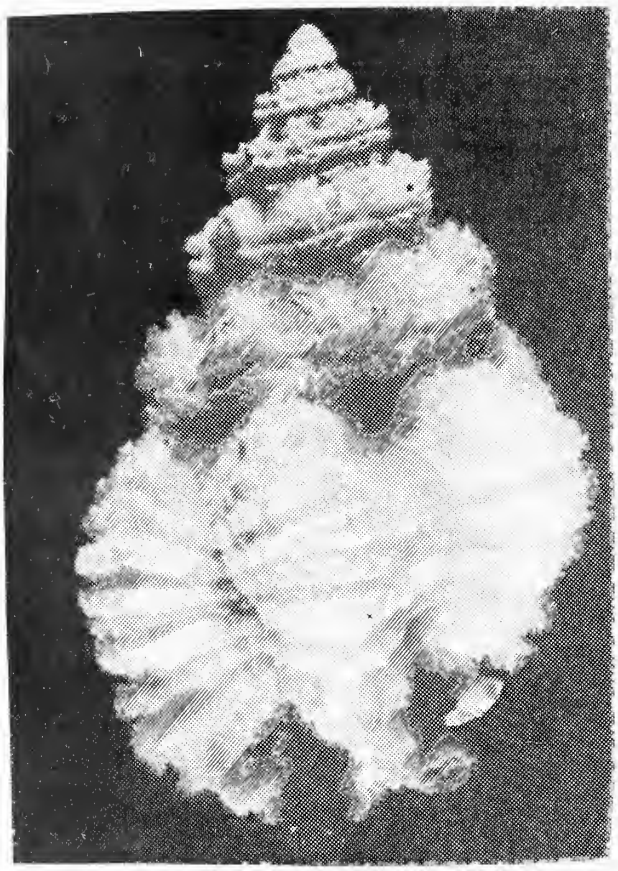


Fig. 2.

Favartia dorothyae Emerson & D'Attilio, 1979

Illustrations are here presented for the first time of the protoconch (Fig. 3.), operculum (Fig. 4.), and radula (Fig. 5.). The protoconch is drawn with the aid of a camera lucida microscope. The specimen used was an immature one with 3 whorls.

The subcircular aperture is reflected in the shape of the operculum and the position of the nucleus situated somewhat below center.

The radular characters are typical for muricopsine genera such as Muricopsis, Murexiella, and Favartia. The rachidian plate is relatively

deep, possessing the strongly projecting central cusp and well developed laterals.

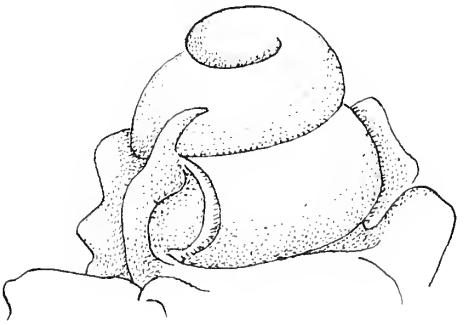


Fig. 3. protoconch

Fig. 4. operculum

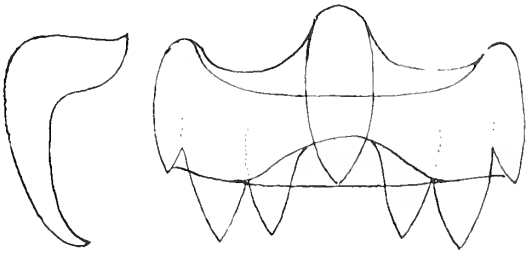


Fig. 5. radula

Literature Cited

Emerson, William K. & Anthony D'Attilio. 1979. Six new living species of Muricacean gastropods. Nautilus. Vol. 93 (1): 1-10. 21 figs.

Acknowledgments

Dr. Hans Bertsch, S.D.N.H.M. kindly read this paper and Mr. Donald Pisor of San Diego, California graciously provided the specimens for study. Mr. David K. Mulliner took the fine photographs.

TEREBRA OF MIDWAY ATOLL

ROGER L. SCHMELTZ

P.O. Box 1060
Alpine, California 92001

Midway Atoll is the next to last set of islands in the Hawaiian chain, approximately 1200 miles northwest of Honolulu. The Atoll consists of two islands, Sand and Eastern, surrounded by a barrier reef. Sand Island is the larger of the two and is 990 acres in area with the highest land above sea level just over 30 feet. It is a U.S. territory not part of the state of Hawaii and only government connected people are there. The only natives are the wildlife, most notable the Laysan albatross or Gooney Bird.

I feel fortunate in having been stationed there with the U.S. Navy from December 1975 to August 1978 since it is where I became a shell collector. I really wasted my first year there using my advanced SCUBA diving certification gathering spiny lobster. The only shells I had bothered to pick up were Terebra because they were easy to spot and plentiful. Once I discovered that there were other beautiful and interesting "critters" out there hiding under coral rock and rubble and buried in sand, my new hobby was started.

Terebra were my first live collected shells. The following list of my live collected Terebra taken on Midway Atoll was compiled by me with aid in identification given by members of the Hawaiian Malacological Society and the San Diego Shell Club.

T. achates Weaver, 1960
T. affinis Gray, 1834
T. babylonia Lamarck, 1822
T. cerithina spaldingi Pilsbry, 1921
T. chlorata Lamarck, 1822
T. crenulata (Linne, 1758)
T. funiculata Hinds, 1844
T. guttata (Röding, 1798)
T. maculata (Linne, 1758)
T. nodularis Deshayes, 1859
T. rosacea Pease, 1869
T. thaanumi Pilsbry, 1921
T. undulata Gray, 1834
Hastula albula Menke, 1843
H. lanceata (Linne, 1767)
H. nitida (Hinds, 1844)
H. penicillata Hinds, 1844
H. tiedemani Burch, 1965

Terebra achates (Fig. 1) a Hawaiian endemic species, is considered rather rare on Oahu. The average size reportedly found there is between 2½ and 4 inches. On Midway they are between 4 and 6 inches. Wagner and Abbott's Standard Catalog of Shells lists the world size record as 13.53 cm. I found six specimens larger than this with the largest measuring 15.4 cm.

Terebra achates was fairly easy to find on Midway. There were four

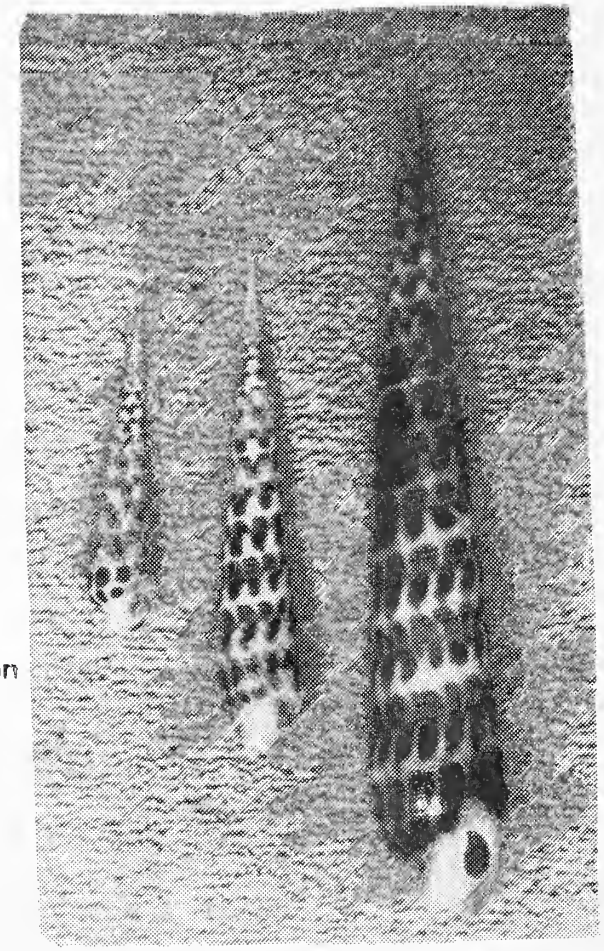


Fig. 1. Terebra achates

areas at which they could be found with some regularity. Only one of the places, however, had good quality specimens. In the other spots the specimens were much smaller and of poorer quality than in my favorite area.

The following of the Terebra and Hastula in the above list were dredged outside the reef in depths from 200 to 300 feet: T. affinis, T. nodularis, T. rosacea, H. albula, H. nitida, H. penicillata, H. tiedemani.

Terebra thaanumi, (Fig. 2.) another Hawaiian endemic, eluded my identification efforts for about a year. My difficulties stemmed from the unusual coloration--creamy white, and the size. The Standard Catalog's record size is 6.06 cm and my three specimens are 7.38, 9.41 and 9.55 cm. About a dozen of this species did show up in the dredging but they were all under 1½ inches with the same creamy coloration.

My largest T. thaanumi was found by a novice collector, a girl I was showing how to find sea shells. It was exposed on a sandy bottom and she just picked it up. Afterward I kept the animal alive in my aquarium for about eight months. The girl gave it to me when she left the island because it was still alive. I gave her some other shells in return, one of which was a Cypraea tesselata. At that time I still didn't have the Terebra identified.

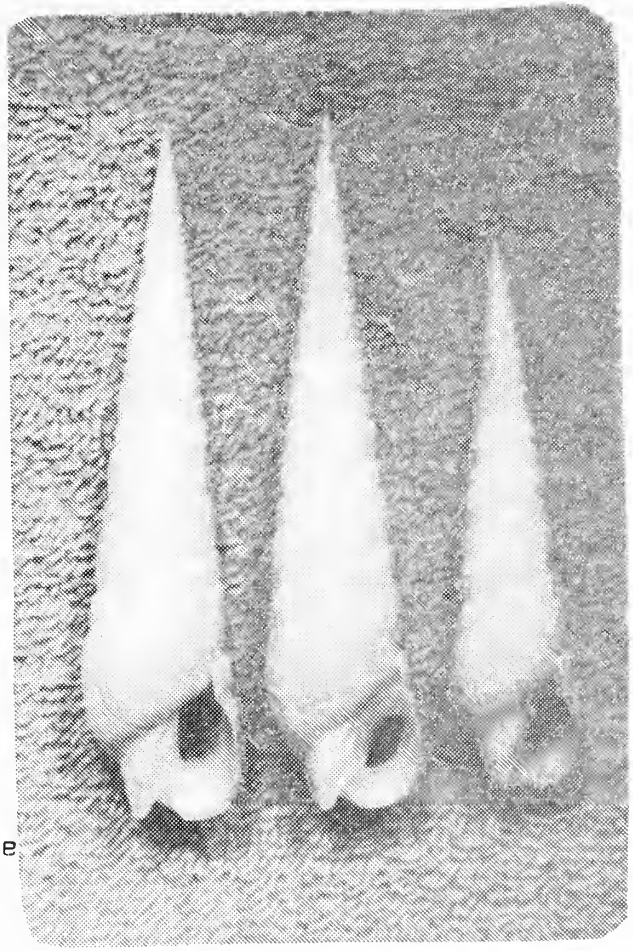


Fig. 2. Terebra thaanumi

Approximately 14 months later I found a crabbed specimen and a live one within 100 feet of the first find. My wife found the fourth, the smallest, a beached specimen with the animal and operculum intact, on the opposite side of the island.

Observing T. thaanumi in the aquarium gave me some insight into the habits which make these "monsters" so hard to find. The animal would only move around to feed for a few hours (6) every five to seven weeks. I never did find one at the end of a track in sand.

NOTICE

Member Ruth Greenberg announces that the Tidepool Gallery is having its Third Annual Rare Shell Show from May 7 to May 25. In addition to a display of "prize-winning worldwide specimen shells on loan to the Tidepool..." a continuous slide show of underwater mollusks will be shown.

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO, CA
MAY 8
1990
PM

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII June 1980 No. 6

PROGRAM: James Stewart, Diving Officer at Scripps Institution of Oceanography, will give an illustrated talk entitled, "A Diver's Diverse Observations."

Christina Maria Ternes, Club Science Fair winner will give a brief outline of her winning project, "How do different environmental ions affect hydra?" and receive her award.

Pictures from the Auction/Potluck will be shown.

There will be a Book-Magazine-Reprint Sale of duplicate library material to benefit our library. Details on p. 77.

Date: June 19, 1980 Time: 7:30 P.M. Place: Room 104

CONTENTS

Club and Library News..... 72

Preliminary Analysis of the Geographic and Bathymetric Distribution of Hawaiian Chromodorids (Gastropoda: Opisthobranchia)
BERTSCH, HANS..... 73

MURICOPSIS JALISCOENSIS Radwin & D'Attilio, 1970 at Panama
D'ATTILIO, ANTHONY..... 78

Book Review--Indo-Pacific Mollusks: Two Recent Contributions
BERTSCH, HANS..... 80

FROM THE MINUTES

MARJORIE BRADNER

The May 15 Club meeting was a rare treat. Sam Hinton, museum curator, marine biologist, writer, artist, musician and university administrator spoke entertainingly on scientific nomenclature and the use of common names in identifying plant and animal life. He ended with audience participation in the appropriate song, "Amphioxus."

The business meeting lasted less than five minutes because Mr. Hinton had agreed to play and sing some more. After half a dozen or so songs, too few for the delighted audience, he ended with "Closing Time At the Aquarium, the Fishes Must Sleep."

LIBRARY NEWS

The Club library has been greatly enriched by our exchanges of publications with two museums. We are grateful to Dr. Barry Roth of the California Academy of Sciences and Dr. William K. Emerson of The American Museum of Natural History for their efforts in arranging the exchanges of back issues of their Museum publications for complete sets of The Festivus.

Received from California Academy of Sciences*

1. Miscellaneous issues of Proceedings of California Academy of Sciences, Fourth series from 1912 to 1972--Vols. 3 to 39.
2. Occasional Papers of California Academy of Sciences from 1960 to 1975.
3. Southern California Academy of Sciences Bulletin. Miscellaneous issues from Vols. 33 to 61.
4. Eastern Pacific Expeditions of the New York Zoological Society. XXXIX (Part VI) and XL (Part VII), Mollusks from the West Coast of Mexico and Central America by Hertlein & Strong.
5. Allan Hancock Pacific Expeditions, Vol. 2 #8 and 12. 1939.

Received from The American Museum of Natural History*

1. Miscellaneous issues of American Museum Novitates from 1934 to 1965.
2. Miscellaneous issues of Bulletin of American Museum of Natural History from 1901 to 1956 (vols. 14 to 111).

* A complete listing of these publications as well as an updated library list will be available to members at the July meeting

Donations to the Club library have also been made by two members, Joyce Gemmell and Agnes Thompson.

Received from Joyce Gemmell.

1. Environment Southwest. Aug. 1969 to Oct. 1973.
2. Of Sea and Shore. Vols. 1 to 7.
3. Seafari. June 1964 to Sept. 1965 (lacks July-Sept. 1964).

Received from Agnes Thompson.

1. Of Sea and Shore. Vols. 1 to 5 complete and several additional issues. Vol. 6 (1 & 4), Vol. 7 (1 & 4), Vol. 8 (1 & 4), Vol. 9 (1).
2. The Echo. W.S.M. Report. 1968-1974.
3. East coast of North & South America Tide Tables for years 1963-1967.
4. Occasional Paper, California Academy of Sciences #35, West American Mollusks of the Genus Conus -II, by G. Dallas Hanna.
5. Shell Album by Helen S. O'Brien (Helen Thompson)

PRELIMINARY ANALYSIS OF THE GEOGRAPHIC AND BATHYMETRIC DISTRIBUTION OF HAWAIIAN CHROMODORIDS (GASTROPODA: OPISTHOBRANCHIA)

HANS BERTSCH

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

SCOTT JOHNSON

Department of Zoology, University of Hawaii, Honolulu, Hawaii 96822

Malacological research in Hawaii has tended to concentrate on the shelled marine and terrestrial species. Numerous papers, monographs, and books have been published in the last 2 centuries based on Hawaiian shelled material (most recently Kay, 1979). The paucity of publications about Hawaiian nudibranchs forms a striking contrast. As a specific example, only 27 species of dorid nudibranchs were named between 1852 and 1860, most by William Harper Pease. There followed a gap of over 100 years--broken only by 4 reports that briefly mentioned dorid nudibranchs--until the 1969 paper by E. Alison Kay and David Young, which reported 50 species of Doridacea from the Hawaiian Islands. Present knowledge of the systematics of Hawaiian dorid nudibranchs, therefore, is based on 7 articles by Pease (published between 1860 and 1871), a half dozen works by Eydoux and Souleyet (1852), Edmondson (1946), Ostergaard (1950 and 1955), and the major paper by Kay and Young, and several recent notes by ourselves (Johnson and Bertsch, 1979; Bertsch and Johnson, 1979 and 1980). Many of the earlier works were based on samples of few specimens, so that little information about the natural history of Hawaiian nudibranchs is currently available in the literature.

We have been surveying the subtidal populations of nudibranchs on the island of Oahu. For over 3 years we have been gathering specimens, data, and in situ photographs by scuba diving. Part of our work was funded by grants from the Center for Field Research, enabling us to lead 2 Earthwatch research teams of 15 and 18 divers during the summers of 1978 and 1979. In this paper, we present a preliminary analysis of our findings, limiting our discussion to one group of dorid nudibranchs, the chromodorids. Species of this family of dorids usually are recognized immediately by their brilliant coloration and soft body texture. The Chromodorididae are primarily tropical species, characterized by the morphology of the reproductive system and the radula (Bertsch, 1977).

Information given by Kay and Young form an intriguing comparison with the results that we have obtained. The majority of Kay and Young's 4 years of collecting was restricted to the littoral zone, that is, shoreward of fringing reefs or on reef platforms. This Hawaiian intertidal habitat is a very narrow region, since maximum tidal fluctuation is restricted to only 2½ feet. Only rarely did Kay and Young examine specimens from deeper subtidal regions.

They collected approximately 127 specimens of 11 species of chromodorids (TABLE 1). The most abundantly collected species, Chromodoris lilacina (Gould, 1852) was common during one year of their study. The other 10 species were represented by less than a dozen specimens each.

We collected 22 chromodorid species, including the 11 that they reported, but in very different proportions. Six of their rare species we collected commonly subtidally; four others of their species we found subtidally in about equal abundance to their intertidal numbers. We found only one specimen of their most abundant species. What this means is that

of the 11 chromodorid species reported by Kay and Young, 6 are subtidal (hence their rareness in the intertidal zone sampled by Kay and Young), 4 might appear either in the subtidal or intertidal, and 1 is intertidal. These species of chromodorid nudibranchs show definite zonation preferences in either the intertidal or subtidal regions.

Twelve of the 22 species we found were common subtidal animals. Hawaiian chromodorids seem to occur more frequently in subtidal habitats.

TABLE 1. Comparison of numbers of specimens collected subtidally by us and intertidally by Kay and Young (1969).

	Total this study, Subtidal Specimens	Kay & Young Intertidal Specimens (their subtidal records in parentheses)
SUBTIDAL		
Chromolaichma youngbleuthi	185	(3)
Chromodoris petechialis	16	1 (3)
Babaina daniellae	18	8
Chromodoris vibrata	17	6 (2)
Hypselodoris lineata	30	7
Chromodoris decora	29	6
NO OBVIOUS PREFERENCE		
Chromodoris imperialis	2	1
Hypselodoris peasei	8	10
Chromodoris trimarginata	4	7
Chromodoris albopustulosa	15	10
INTERTIDAL		
Chromodoris lilacina	1	approx. 60

We sampled (Figure 1) 5 main areas on the island of Oahu: the Lookouts (including Hanauma Bay), Pupukea on the north shore, Makua, Fort Kamehameha Beach (eastern edge of the entrance to Pearl Harbor), and Magic Island (at the edge of Waikiki, at the mouth of the Ala Wai Canal).

Each species of chromodorid is found preferentially at specific sites around the island of Oahu. Moreover, groups of species were consistently found co-occurring at the same location. By simply choosing the day's diving location on the island of Oahu, we could predict the species of chromodorid that we would probably collect.

Some sites showed a similarity in the species assemblages present, but none were completely identical. Similar groups were found at Fort Kamehameha Beach and Magic Island, and at Pupukea, Makua and the Lookouts (see Bertsch and Johnson, 1979, for a description of several of these sites).

In addition to site preferences, the species showed distinct differences in the average depth at which they were found (Figure 2). We collected sufficient specimens of several species to analyze depth distribution. The common species found at Lookouts, Pupukea, and Makua (Chromodoris petechialis, Chromolaichma youngbleuthi, and an undescribed

Figure 1. Map of Oahu, Hawaii, showing locations of study sites.

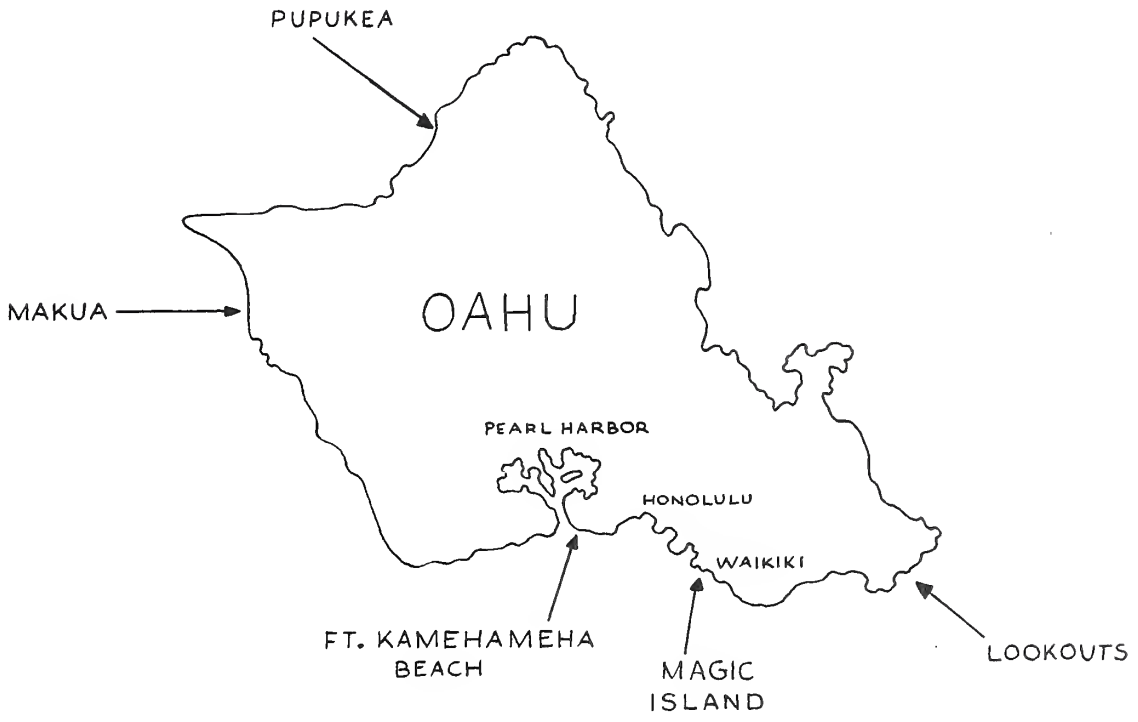
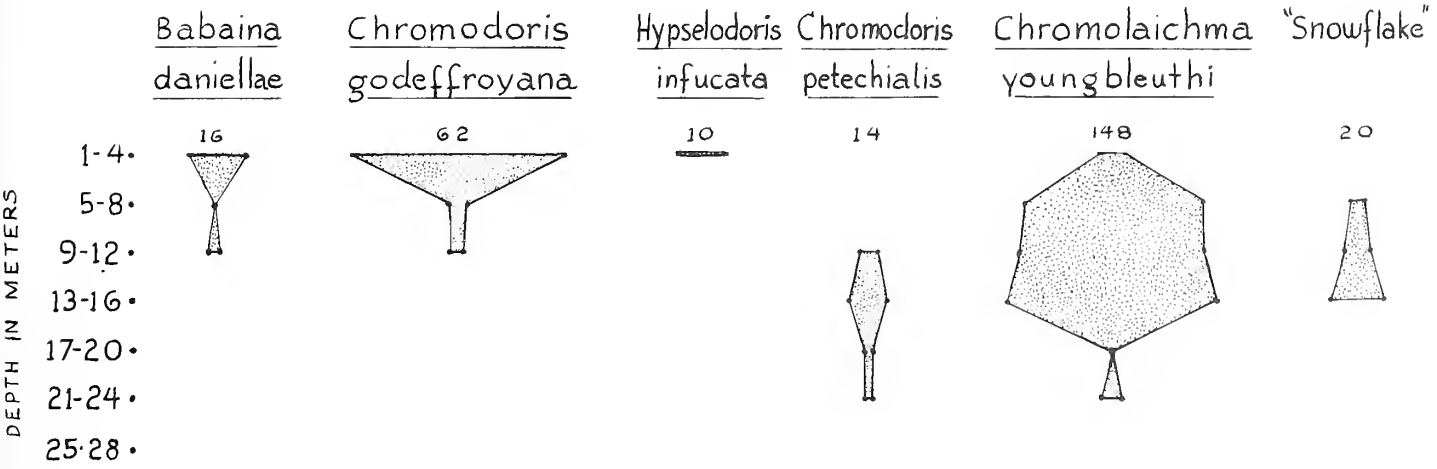


Figure 2. Bathymetric distribution of selected Hawaiian chromodorids



Width of stippled areas indicates relative abundance at the various depths; number below each species indicates total number of specimens collected.

species of chromodorid "snowflake") were found in average depths of 9.9 to 14.6 meters. Only rarely were they collected in less than 5 meters of water. The common species from Magic Island and Fort Kamehameha Beach (Babaina daniellae, Chromodoris godeffroyana and Hypselodoris infucata) were found in much shallower water (averaging from 2.2 to 4.8 meters). These species were almost absent deeper than 5 meters.

These data reflect the habitat differences between the various study sites, that is, Magic Island was shallower than the Pupukea site. However, the depths at which each species was found were not the only available depths at which they could occur. The species from Magic Island occurred from 1 to 4 meters, but the habitat extends to over 10 meters deep. Hence we did not collect Chromolaichma youngbleuthi from the deeper depths at Magic Island, nor did we collect Chromodoris godeffroyana at Pupukea.

Most of these chromodorid species occur predominantly in subtidal depths. These subtidal species show a three-dimensional partitioning of the habitat space: each species occurs predominately only at certain localities, and each species has a definite depth distribution.

We are continuing our research on the Hawaiian chromodorids to determine other geographic differences throughout the Hawaiian Islands, to ascertain any seasonality, to measure niche separations among species groupings, and to make ecological comparisons with other zoogeographic faunal provinces. We are also working on the taxonomy of the species involved.

ACKNOWLEDGMENTS

A grant from Earthwatch and the Center for Field Research provided the necessary funds and volunteers that made possible the collection of data during June-July 1978 and 1979. We are grateful to all the participants on our Hawaiian mollusks expeditions: Mel Brody, Serena Chen, Mary Connelly, Rosemary Dorostkar, Scott Greenberg, Catherine Hansen, Don and Jean Jurgs, Howard Kaufman, Jane Kent, Tom Knapki, Lisa Lamoreaux, Peggy Lynch, Leonce Many, Brian McElaney, Rebecca McElroy, Margaret McKinley, John Minichiello, Kathy Nedomatsky, Steve Norton, Tom Parleto, Andrew Peretz, Dean Ritts, Roland Rizzi, Eric Rutherford, Mark Stetter, Dana Swinsky, Larry Targett, Frances Tear, Peggy Tietze, Matt Tikka, Neal Voelz, and Gregg Wilson.

We also thank Judith Bertsch and Lisa Boucher for sharing many dives and helping with collecting. We thank Anthony D'Attilio for help with the text figures, and James Lance, David Mulliner, and Jules Hertz for textual comments.

LITERATURE CITED

Bertsch, Hans
1977. The Chromodoridinae nudibranchs from the Pacific coast of America. Part I. Investigative methods and supra-specific taxonomy. The Veliger 20(2):107-118; 3 test figs.

Bertsch, Hans and Scott Johnson
1979. Three new opisthobranch records for the Hawaiian Islands. The Veliger 22(1):41-44; 1 plt.

Edmondson, Charles Howard
1946. Reef and shore fauna of Hawaii. Bernice P. Bishop Mus. Spec. Publ. 22: 381 pp.; 223 text figs.

Eydoux, J.F.T. and F.L.A. Souleyet
1852. Voyage autour du monde....sur la corvette la Bonite, etc. Zoologie, vol. 2:1-664.

Gould, Augustus Addison
1852. Mollusca and Shells. Vol. 12 in: U.S. Exploring Expedition during

the years 1839-1842 under the command of Charles Wilkes, U.S.N. Boston. xv+ 510 pp.

Johnson, Scott and Hans Bertsch
1979. A population study of the nudibranch Chromodoris godeffroyana. West. Soc. Malac. Ann. Report 11:8.

Kay, E. Alison
1979. Hawaiian marine shells. Reef and shore fauna of Hawaii. Section 4: Mollusca. Bernice P. Bishop Mus. Spec. Publ. 64(4):xviii + 653 pp.: 195 text figs.

Kay, E. Alison and David K. Young
1969. The Doridacea (Opisthobranchia: Mollusca) of the Hawaiian Islands. Pacific Science 23(2): 172-231; 82 text figs.

Ostergaard, Jens Mathias
1950. Spawning and development of some Hawaiian marine gastropods. Pacific Science 4(2): 75-115; 42 text figs.
1955. Some opisthobranchiate mollusca from Hawaii. Pacific Science 9(2):110-136; 2 plts.; 17 text figs.

Pease, William Harper
1860. Descriptions of new species of Mollusca from the Sandwich Islands. Proc. Zool. London 28:18-37.
1861: Descriptions of new species of Mollusca from the Pacific Islands. Proc. Zool. Soc. London: 242-247.
1864. Letter. On errors and omissions in former communications. Proc. Zool. Soc. London 1863: 510.
1866. Remarks on nudibranchiata inhabiting the Pacific Islands, with descriptions of two new genera. Amer. Jour. Conch. 2(3):204-208.
1868. Synonymy of marine Gastropodae inhabiting Polynesia. Amer. Jour. Conch. 4(3):103-132.
1871. Descriptions of nudibranchiate Mollusca inhabiting Polynesia. Amer. Jour. Conch. 6(4):299-305; plts. 19-22.
1871b. Descriptions of new species of nudibranchiate Mollusca inhabiting Polynesia. No. 2. Amer. Jour. Conch. 7(1):11-19. plts. 3-9.

CLUB LIBRARY SALE

A sale of duplicate library material will be held at this month's meeting. Sale material will be available at very low prices before the meeting begins and during coffee break. Proceeds will benefit the library and members are welcome to donate duplicate books, magazines, and reprints dealing with marine life from their personal libraries to the June sale.

ADDITIONS & CORRECTIONS TO THE ROSTER

New Member: Academy of Natural Sciences Philadelphia, Dr. Robert Robertson, Department of Malacology, Nineteenth and the Parkway, Philadelphia, Pa. 19103

Corrections: Pat & John Sage. Phone No. 267-3264
Edwin Roworth, Address 1361 Windsor Rd. Cardiff, Ca. 92007

MURICOPSIS JALISCOENSIS RADWIN & D'ATTILIO, 1970 AT PANAMA

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

An interesting morphological variant of Muricopsis jaliscoensis (Fig. 1) has recently been brought to my attention. The locality of this species at Panama is apparently a range extension since its occurrence there has not been previously recorded in the literature.

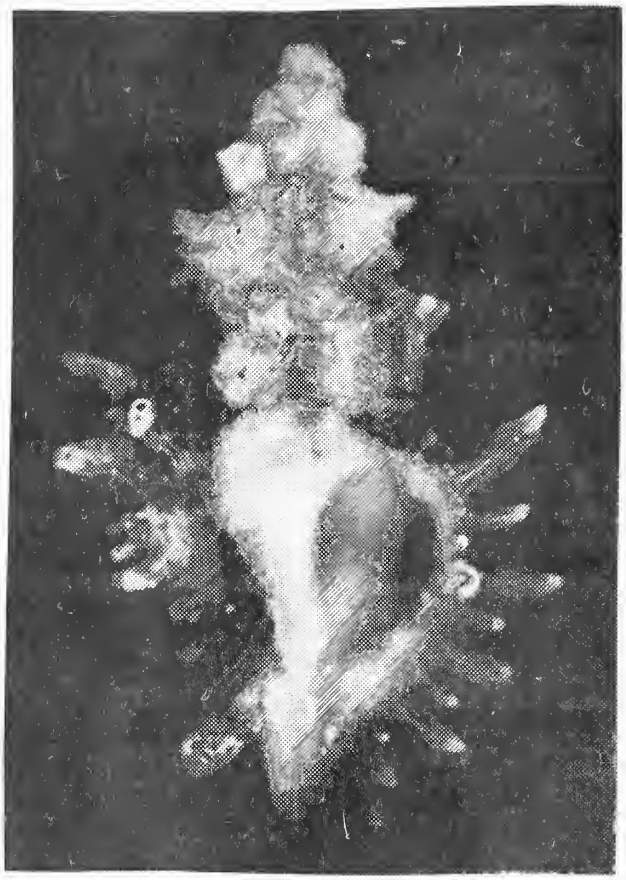


Fig. 1. M. jaliscoensis
Location: Panama. Length: 25 mm
Leg. Terry Hammes
Donor: Loyal J. Bibbey SDNHM# 73597

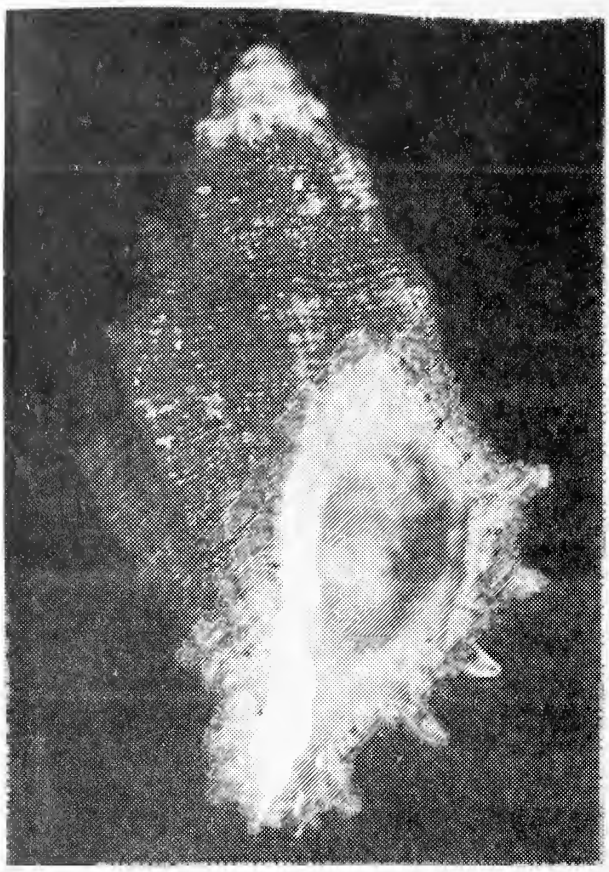


Fig. 2. M. jaliscoensis
Location: Bahia Coastocomate,
Jalisco, Mexico. Length: 26 mm
Leg. G.E. Radwin & L.J. Bibbey
SDNHM #63000

The Panama form may be distinguished from that of central Mexico (Fig. 2) by its longer and more numerous spines and its relatively more slender shell with a higher, angulate spire which is additionally ornamented with spines. By contrast, the more obtuse and weakly angulate spire of the Mexican form has a relatively spineless spire and the spine terminations of the cords at the varices are restricted to the major cords. Six specimens collected by Mr. Royce Hubert at Isla Gubanador, Magdalena Bay in central Pacific Panama and four additional specimens from Panama donated by

Mr. Loyal J. Bibbey were used for this study. Among these specimens were intermediate forms (Figs. 3 & 4) showing characters suggesting the type locality as well as the extreme Panama form as shown in Figure 1. Although

Fig. 3. M. jaliscoensis
Location: Isla Gubanador, mouth of Magdalena Bay, central Pacific Panama. Length: 24 mm
Leg. Royce Hubert SDNHM #73598
Date: 8 September 1979

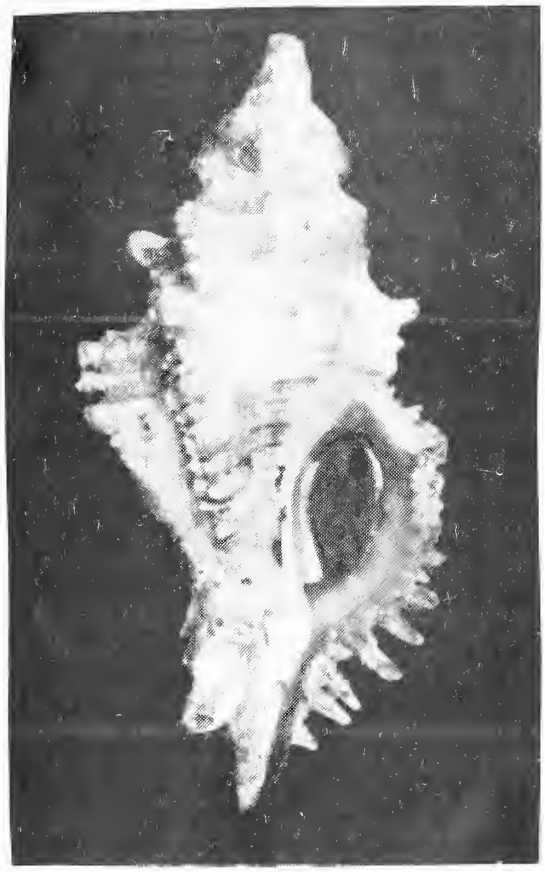


Fig. 4. M. jaliscoensis
Location: Isla Gubanador, mouth of Magdalena Bay, central Pacific, Panama. Length: 32 mm
Leg. Royce Hubert SDNHM #73598
Date: 8 September 1979

the spiny nature of the shell is noticeable it may be remarked here that the number of spiral cords are the same for both forms. On some specimens of the Panama form there is a more widely spread callus on the upper portion of the columella as in Figure 1. Figure 4, also from Panama, shows a specimen having the slenderness of the Panama specimen in Figure 1 and the intermediate spinose characters of Figure 2.

Acknowledgments

Photography was done by Barbara W. Myers and photographic processing by David K. Mulliner. Specimens were donated by Loyal J. Bibbey and Royce Hubert.

INDO-PACIFIC MOLLUSKS: TWO RECENT CONTRIBUTIONS

HANS BERTSCH

Curator Marine Invertebrates, San Diego Natural History Museum

Cernohorsky, Walter O. 1978. TROPICAL PACIFIC MARINE SHELLS. Pacific Publications, Sydney. 352 pp.; 68 plts.; 17 text figs.

Kay, E. Alison. 1979. HAWAIIAN MARINE SHELLS. Reef and Shore Fauna of Hawaii, Section 4: Mollusca. Bernice P. Bishop Museum Special Publication 64 (4): xviii + 653 pp.; 195 text figs.

Two recently published books highlight aspects of Indo-Pacific molluscan studies. They serve two different purposes, emphasized by their different taxonomic and geographic coverage, writing style, and illustrations.

Cernohorsky's TROPICAL PACIFIC MARINE SHELLS (TPMS) should have been titled Marine Shells of the Pacific, Vol. III, despite the author's disclaimer that the name change was at the request of the publisher to prevent "confusion among collectors." Most dedicated conchologists are certainly capable of distinguishing I, II, and III. This work is not a faunal study, but descriptions and illustrations of many shells from various parts of the Indo-Pacific. It is an identification guide for shell collectors, but is not comprehensive. If one has all three volumes, the collector's chance of identifying any particular shell is increased. Because of the random selection process for shells included in the volume, the work is awkward to use. If one does not find a shell in volume III, one goes to vol. II; if not there, to I, in each case having to use an additional index. Obviously, to have published a synoptic index in TPMS to all three volumes would have facilitated use of this series. In several places (pages 72, 91, 106-107, 119-120, and 145) are lists of nomenclatural changes for taxa discussed in volumes I and II. None of these species discussions are indexed. The arrangement of species within a genus is haphazard--with no apparent order. One is given the impression that the species descriptions were written and the specimens photographed as they arrived on the author's desk, with no subsequent thought to rearranging the material into a coherent pattern. A simple alphabetical sequence of species within genera would help the reader to find species (especially among the 100+ species of Conus).

The systematic overview of molluscan classification is useful. Treating Polyplacophora and Aplacophora as subclasses of Amphineura is not consistent with most modern usage, in which they are afforded full class rank. I was especially glad to see at least a token inclusion of various nudibranch families. Use of dorid, dendronotid, arminid and eolid divisions would have given a systematic arrangement to what is now simply a list of families. Of minor concern is the misspelling of several families (Polyceridae, Tethydidae, and Dotonidae, sic).

The book shows evidence of significant scholarly research which is not reflected in the scanty literature cited section; moreover, few references and justifications are given in the text for validation of synonymies and other informations presented. Perhaps an identification guide should not be expected to give all the pertinent literature.

Each species treated is illustrated by a photograph in the plate section at the back of the book, has a brief written description of salient shell characters, and a very brief indication of its general range of occurrence.

The book is written by a known expert on Indo-Pacific mollusks. Given his familiarity with shells, it can be used by the shell collector hobbyist to identify his or her specimens with a reasonable guarantee of accuracy. Used in conjunction with its predecessor volumes, TROPICAL PACIFIC MARINE SHELLS fulfills that purpose.

HAWAIIAN MARINE SHELLS is the mollusk portion of the Bishop Museum's multi-volume revision of C.H. Edmondson's REEF AND SHORE FAUNA OF HAWAII. This prestigious series has a high quality of editorial control, and Kay's work is a worthy volume. This book is a comprehensive malacological faunal overview, similar in style and intent to A. Myra Keen's masterpiece, SEA SHELLS OF TROPICAL WEST AMERICA. Kay carefully documents the majority of her statements, properly acknowledging the other scientists upon whose work any researcher is dependent. All of her references are detailed in the literature cited, including the authorship of the species. The reader can readily determine the basis for synonymies and sources for other information presented.

The introduction consists of an excellent survey of the ecology and zoogeography of Hawaiian marine mollusks, their human exploitation and study, and the natural history of the islands.

Illustrations are placed throughout the text, close to the descriptions of the species. Often pertinent ecological information is given. The introductions to suprageneric taxa are particularly well done, including information on radular morphology, reproduction, veliger stage and development, and other aspects of their natural history.

Besides being an authoritative guide for the identification of almost all the Hawaiian mollusks, it also introduces major aspects of the biology of these animals and gives the researcher a ready entry into the literature.

There are a number of new species described in the book. Regrettably they are not separately indexed; a separate listing of these new taxa should have been included.

For a majority of species the known range in the Hawaiian chain is not specified. Since these islands stretch across 1600 miles, animals known only from some of the islands have a different distribution than those known from all the islands. It would also have been appropriate to have given more information about the illustrations (including specimen collecting locality of an original picture).

Both of these recent books were written by well-known researchers. They are different in extent of coverage (Kay's is a fairly comprehensive faunal guide), amount of information and literature sources given (Cernohorsky has written a conchological book, whereas Kay has authored a malacological reference work). The prospective purchaser of either volume must keep these differences in mind. This reviewer personally prefers Kay's volume, because it is more complete, is easier to use, has well-documented references, and contains a great amount of information on the biology and natural history of mollusks.

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO, CA
JUN 12
1980
PM

DEFEAT
MUSCULAR DYST PHY
SUPPORT M

Smithsonian Institution
Library-Acquisitions
Acct #9010520201
Washington D.C. 20560

THIRD CLASS MAIL
RETURN POSTAGE GUARANTEED

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII July 1980 No. 7

PROGRAM: Anthony D'Attilio will give an illustrated presentation on the shell and its radula.

Muricids will be the featured shells for July. Bring in your Murex for display.

There will be a continuation of the magazine & reprint sale.

CONTENTS

Club News..... 83

Observations on NIPPONOTROPHON SCITULUS (Dall, 1891)
(Gastropoda: Muricidae: Muricinae)
MYERS, BARBARA W. & ANTHONY D'ATTILIO..... 84

NATICA (LUNAIA) LUNARIS Berry, 1964
POORMAN, FORREST & LEROY POORMAN..... 90

In Memoriam Emery P. Chace..... 91

OBSERVATIONS ON NIPPONOTROPHON SCITULUS (DALL, 1891) (GASTROPODA: MURICIDAE: MURICINAE)

BARBARA W. MYERS and ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Nipponotrophon scitulus (Dall, 1891).

Trophon (Boreotrophon) scitulus Dall, 1891: 188; DALL, 1895: 712, pl. 27, fig. 5; WILLETT, 1938: pl. 1, fig. 1; KOSUGE, 1975: pl. 8, fig. 5.
Neptunea (Trophonopsis) lasia Dall, 1919: 338.
Trophon (Neptunea) lasia (Dall). DALL, 1921: 111; OLDROYD, 1927: 39, 40.
Trophon (Neptunea) tenuisculpta (of authors, not Carpenter, 1866) DALL, 1921: 111, pl. 11, figs. 11, 12; OLDROYD, 1927: 39, pl. 30, figs. 3, 7.
Trophon (Neptunea) scitulus (Dall). DALL, 1921: 109, pl. 13, fig. 6; OLDROYD, 1927: 31, pl. 15, fig. 4.
Trophon lasius (Dall). WILLETT, 1938: 1-11, pl. 1, figs. 2-6.
Boreotrophon scitulus (Dall). ABBOTT, 1974: 189, fig. 1972.
Trophonopsis lasius (Dall). ABBOTT, 1974: 191, fig. 2000.
Nipponotrophon scitulus (Dall). RADWIN & D'ATTILIO, 1976: 85, pl. 14, figs. 10, 11.
Nipponotrophon lasius (Dall). RADWIN & D'ATTILIO, 1976: 84, pl. 13 figs. 6-8.

Two specimens of Nipponotrophon scitulus (Dall, 1891) were recently donated to the San Diego Natural History Museum by Loyal J. Bibbey (SDNHM Lot #73595). These specimens were trawled from 300 to 400 ft. on the south side of La Jolla Trench, San Diego, California by Ronnie Nicols, commercial fisherman.

After identifying these specimens, we noted some controversy in the literature regarding the range for N. scitulus. Dall (1902) stated the range probably extended to the San Pedro Channel, Ca., but Dall (1921) only listed the range from the Pribilof Islands to Unalaska Island, Bering Sea. Keen (1937) lists only latitude 55° to 57° for the range. Radwin & D'Attilio (1976) list the range cited by Dall (1921). Burch (1945) reported that H.N. Lowe and Dr. F. Baker had collected N. scitulus off Pt. Loma, San Diego, Ca. in 50 fms.

We then compared N. scitulus with a similar species, N. lasius (Dall, 1919), which ranges from the Bering Sea to Todos Santos Bay, Baja California, Mexico. (Radwin & D'Attilio, 1976).

Dall's type of N. scitulus which he figured in 1895 (Proc. U.S.N.M. 17: pl. 27, fig. 5) is described as a thin, white, five whorled shell (it is not clear if this includes the protoconch), 17.5 mm long with a high spire and a long open canal. The body whorl bears six strong spiral cords and 13 lamellate varices becoming spinose on the shoulder.

Dall's type of N. lasius was not figured until 1938 (Willett: Nautilus 52(1): pl. 1, fig. 6). Dall described it as a white, slender, fusiform shell of more than five whorls (nucleus decollated). The body whorl bears axial sculpture of numerous (no number) incremental lines and spiral sculpture of 25 narrow cords. The body whorl is rounded not shouldered and its length is 30 mm.

Trophon tenuisculptus Carpenter, 1866 was described from a Pleistocene fossil collected at Santa Barbara, California. The type was not figured until 1921 (Van Winkle). Carpenter's species was confused for many years with a Recent species from the west coast of North America, (Dall, 1921) and (Oldroyd, 1927). Willett (1938) compared the type figure and Carpenter's description with the Recent species that had been labelled T. tenuisculptus in collections and in consultation with Dr. U.S. Grant and A.M. Strong concluded that T. tenuisculptus Carpenter, 1866 is a Pleistocene fossil, a Tritonalia (Ocenebra) and not in the Recent fauna. He placed T. tenuisculptus (of authors, not Carpenter, 1866) in the synonomy of Nipponotrophon lasius (Dall, 1919).

In illustrating the variablilty of N. lasius, Willett (1938) figured six different forms. Willett's Fig. 1 resembles N. scitulus (Dall, 1891), but he makes no mention of this taxon. His Fig. 6 is the type of N. lasius. We have examined an extensive series of these forms and reach the same conclusion arrived at by Willett; that the species is a highly variable one. However, for some unexplained reason Willett omitted the earliest name for the species which is N. scitulus (Dall, 1891). N. lasius is a junior synonym.

Figs. 1 and 2 are dorsal and ventral views of Bibbey specimen A. This specimen has five spiral cords on the body whorl and 13 lamellate varices, becoming spinose on the shoulder. It measures 16 mm long, is thin, white, fusiform, has five whorls without the protoconch and has a long, open, slightly recurved canal. The protoconch, Fig. 3, has 1½ smooth convex whorls. This specimen compares nearly identically with the photograph of Dall's type of N. scitulus Cat. #122557, USNM, (Kosuge, 1975).

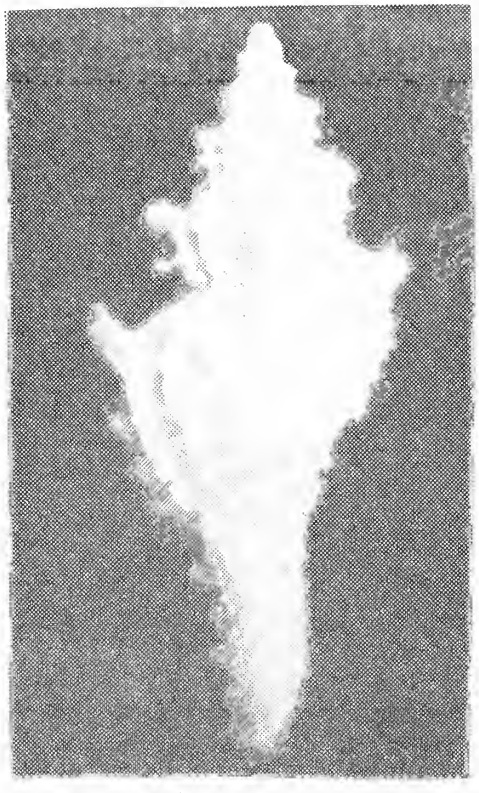


Fig. 1. Bibbey specimen A
Dorsal view. 16 mm.

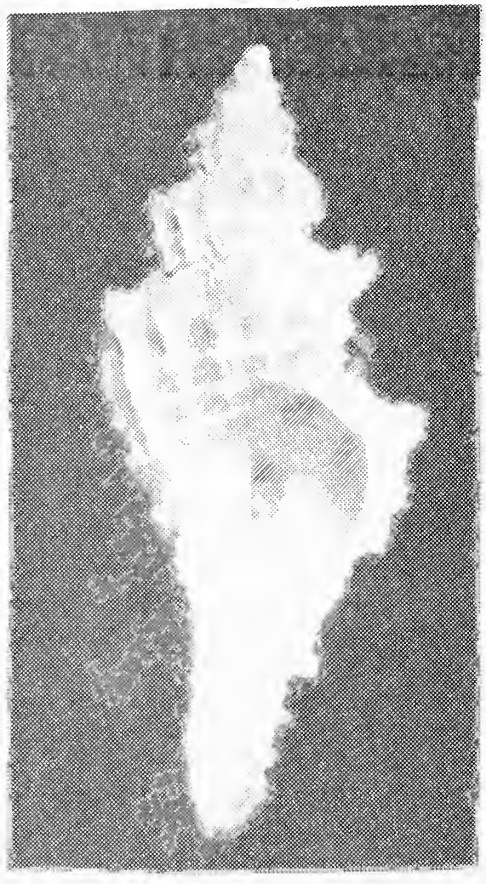


Fig. 2. Bibbey specimen A
Ventral view. 16 mm.

Fig. 4 illustrates the operculum of Bibbey specimen A and Fig. 5 shows the radula of the same specimen.

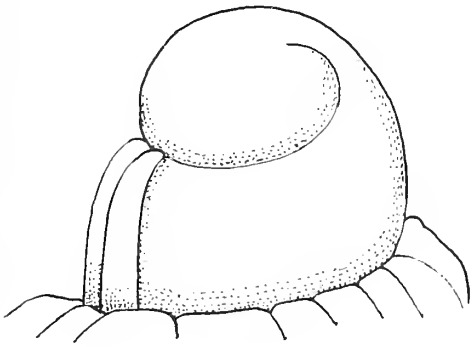


Fig. 3. Protoconch of Bibbey specimen A.

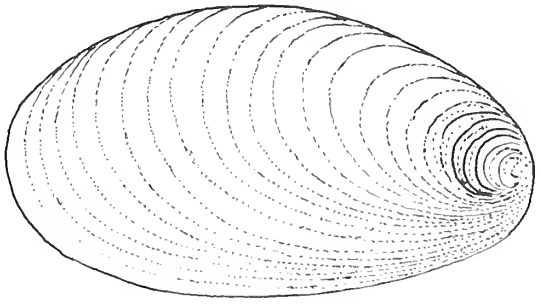


Fig. 4. Operculum of Bibbey specimen A.

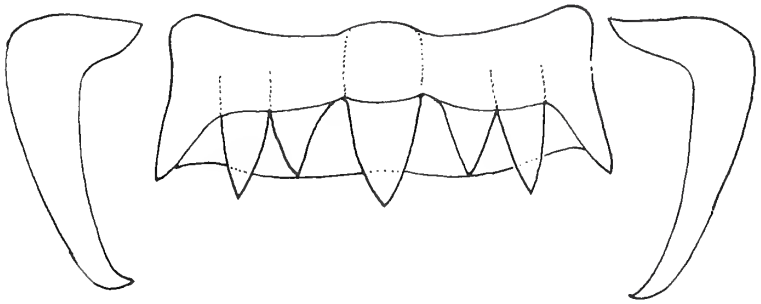


Fig. 5. Radula of Bibbey specimen A.

Figs. 6 and 7 are dorsal and ventral views of Bibbey specimen B. This form has six whorls and is 18 mm long. The body whorl has five spiral cords with weaker intercalary cords and the 11 varices are less lamellate. There are no spines on the shoulder, but it appears slightly tabulate. The siphonal canal on this specimen has been broken.

Lot #22951 in the San Diego Natural History Museum contains two specimens labelled N. lasius from Catalina Island, California, here illustrated in Figs. 8 and 9. Fig. 8 is a 7 mm specimen with 3½ whorls. The body whorl has five strong spiral cords and 14 spinose shouldered, lamellate varices. Fig. 9 is a 14 mm specimen with five whorls. The body whorl has 8 strong spiral cords and a couple of weaker intercalary cords. The axial sculpture is reduced to vertical ridges (13) and the shell is rounded not shouldered.

Fig. 6. Dorsal view of Bibbey specimen B, 18mm.

Fig. 7. Ventral view of Bibbey specimen B, 18 mm.

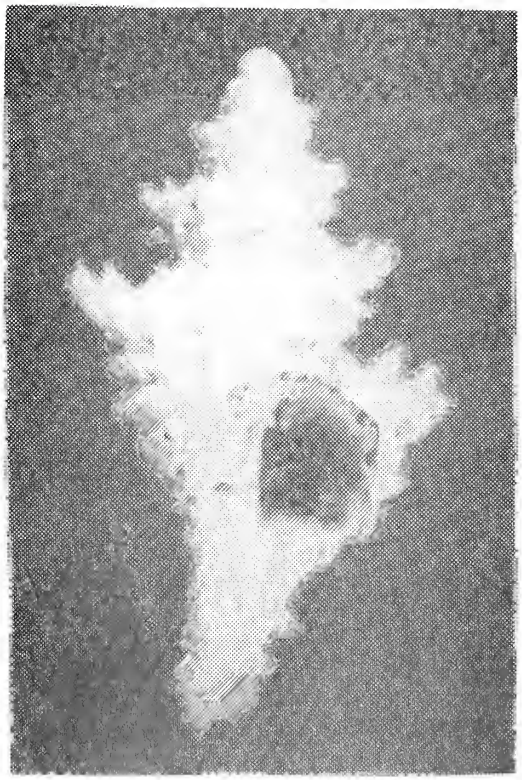


Fig. 8. SDNHM Lot #22951 7mm. Catalina Is. Ca. Ventral view.

Fig. 9. SDNHM Lot #22951 14 mm Catalina Is. Ca. Dorsal view

Lot #55562 in the San Diego Natural History Museum contains two specimens labelled N. lasius also from Catalina Island, California and we illustrate them in Figs. 10 and 11. Fig. 10 is a 16 mm specimen with five whorls. The body whorl has 10 strong spiral cords with no intercalary cords and there are 13 axial costae. It is rounded not tabulate. Fig. 11 is a 25 mm specimen of six whorls. The body whorl bears 13 close set major spiral cords with some intercalary cords. Axial sculpture consists of numerous very weak costae and the entire surface is strongly covered with incremental lamellae. The shell is rounded not shouldered. This specimen compares with Dall's type of N. lasius as figured in Willett (1938).

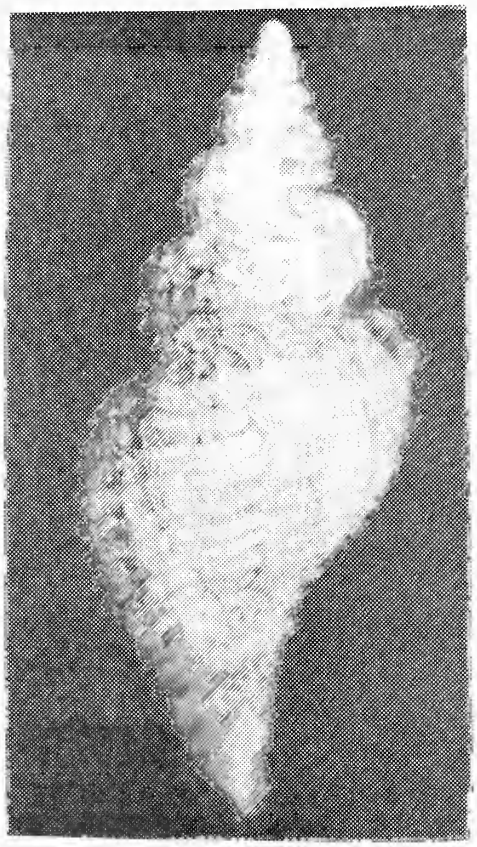


Fig. 10. SDNHM #55562 16 mm Catalina Is. Ca. Dorsal view

Fig. 11. SDNHM #55562 25 mm Catalina Is. Ca. Dorsal view

We therefore conclude that N. scitulus and N. lasius are synonymous. N. scitulus being the earliest name has priority. These illustrations show the range of morphological variation of this species and demonstrate that without seeing the intermediates, it is very easy to assume that there are at least two different species.

Acknowledgments

Mr. Loyal J. Bibbey generously donated the specimens from the La Jolla Trench used in this study. Mr. Jules Hertz made some helpful suggestions.

Literature Cited

Abbott, R. Tucker. 1974. American Seashells. 2nd Edition. 663 pp., 6405 text figures. Van Nostrand Reinhold.

Burch, J.Q. ed. 1944-46. Distributional list of the West American marine Mollusca from San Diego, California to the Polar Sea, from the Minutes of the Conchological Club of Southern California. Part II. #51 (1945).

Carpenter, P.P. 1866. The Pleistocene Fossils...with Description of New Species. Ann. & Mag. Nat. Hist. 321-325.

Dall, William Healey. 1891. Scientific Results of Explorations by the U.S. Fish Commission Steamer Albatross. Report on Mollusca and Brachiopods. Proc. USNM Vol. 14, pp. 173-191.

1895. Scientific Results of Explorations by the U.S. Fish Comission Steamer Albatross. On some new or interesting west American shells... Proc. USNM Vol. 17, pp. 675-733, pls. 23-32.

1902. Illustrations and descriptions of new, unfigured or imperfectly known shells, chiefly American in the U.S. National Museum. Vol. 24: 499-566. pls. 27-40.

1919. Descriptions of New Species of Mollusca from the North Pacific Ocean in the collection of the U.S. Natl. Mus. Proc. USNM Vol. 56: 293-371.

1921. Summary of the Marine Shellbearing mollusks of the northwest coast of America... Bull. USNM 112. 215 pp. 22 pls.

Keen, A.M. 1937. An Abridged Check List and Bibliography of west North American Marine Mollusca. 87 pp. Stanford Univ. Press.

Kosuge, Sadao. 1975. Illustrations of type specimens of mollusks described by William Healey Dall. 29 pls.

Oldroyd, Ida S. 1927. The Marine Shells of the west coast of North America. Vol. 2(2): 304 pp. pls. 30-72. Vol. 2(1) pls. 1-29.

Radwin, George E. & Anthony D'Attilio. 1976. Murex Shells of the World. 284 pp. 37 pls. Stanford Univ. Press.

Van Winkle, K.E.H. 1921. Illustrations and Descriptions of fossil Mollusca contained in the paleontological collections of Cornell University. Bull. Am. Paleont. Vol. 8(36): 3-6. pl. 1. figs. 6-9.

Willett, G. 1938. Remarks on some west American Mollusca. Nautilus. Vol. 52(1): 10-11. pl. 1. figs. 1-6.

NEW MEMBERS

Bukry, David, 675 So. Sierra #32, Solana Beach, Ca. 92075, 755-8998
Keeler, James H., 30 Park Lane, Chagrin Falls, Ohio 44022
Kemp, Bruce, 9420D Carlton Oaks Dr. Santee, Ca. 92071, 449-7610
Musgrove, Jean, 875 Tourmaline St. San Diego, Ca. 92109, 488-3921
Scripps Institution of Oceanography Library, C-075C, Univ. Of Calif. at San Diego, La Jolla, Ca. 92093

CHANGE OF ADDRESS

Strigliabotti, Susan M., 2582 Del Mar Heights Rd. #7, Del Mar, Ca. 92014 481-6177

NATICA (LUNAIA) LUNARIS BERRY, 1964

FORREST & LEROY POORMAN

15300 Magnolia Street, Space 55
Westminister, California 92683

In 1964 Dr. S. Stillman Berry described Natica (Lunaia) lunaris (Figs. 1a & 1b) in his LEAFLETS IN MALACOLOGY, Vol. I(24): 147-154. He listed Estero Tastiota, Sonora, Mexico as the type locality (offshore in 14-25 fms). The species differs from other Naticas in that the funicle, or ridge of callus, which ascends out of the umbilicus along the inner lip, is reduced to a scarcely noticeable projection on the edge of the lip. This feature led Dr. Berry (1964) to describe a new genus, Lunaia, within the Naticidae. Subsequent workers have placed the species in Natica primarily because of the calcareous operculum.

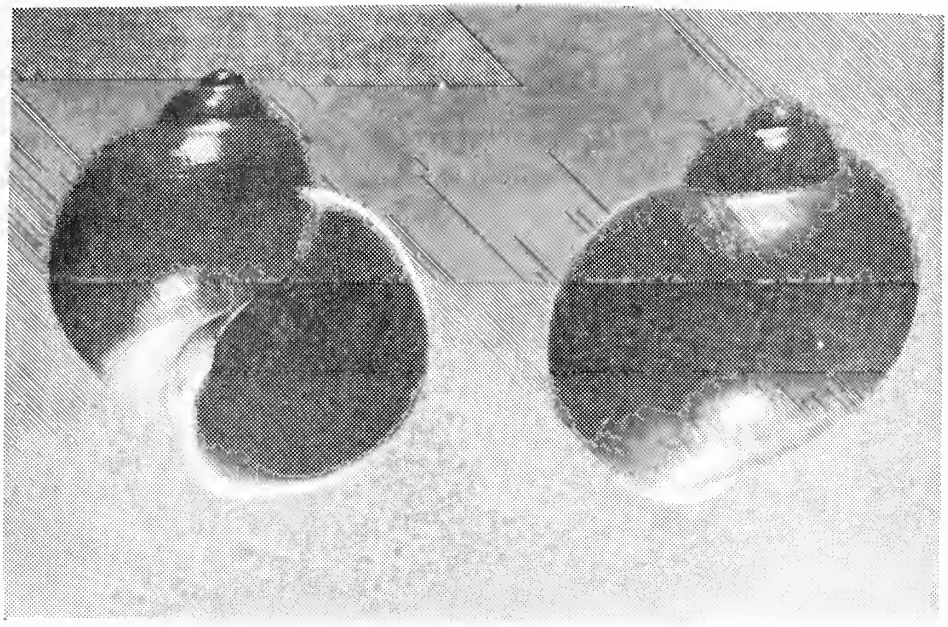


Fig. 1a. ventral view Fig. 1b. dorsal view
Natica (Lunaia) lunaris Berry, 1964

In the summer of 1979, we received a letter from Phil and Jewel Covey of Bahia San Carlos, Sonora, telling us that they had specimens of this species. This information added great anticipation to our annual migration to Guaymas in October. As soon as the trailer was in place, we visited the Coveys. They had made an extensive trip south as far as Manzanillo, Colima in June 1979. Their main objective was to walk the beaches. They reported that collecting could be considered poor compared to former years. This verified reports we had from as far south as northern Peru. It also reflected our own experiences at San Carlos during October and November.

However, during a low tide in July 1979, while walking a beach at Bahía Matenchén, Nayarit they came on an area littered with Natica (Lunaia) lunaris (normally a deep water species). All specimens were without animals.

Due to the generosity of the Coveys we now have in our collection a beautiful growth series of this previously hard to get species. In October 1979 we visited Bahía Matenchén with great expectations and found one dead specimen.

IN MEMORIAM

EMERY P. CHACE
1882 - 1980

It is with sadness that we report the passing of Emery P. Chace, a charter member of The San Diego Shell Club and Curator of Marine Invertebrates at The San Diego Natural History Museum from 1954 until his retirement thirteen years later in 1967.

Emery Chace became interested in shells as a young married man and he and his wife, Elsie Chace, were active collectors throughout their married life. They collected marine mollusks and fossils all along the west coast of the United States and in Mexico and collected land mollusks in the mountains and deserts. Many of their shells are a part of the scientific collection of the SDNHM. They kept detailed records of their findings and trips in their notebooks and the information contained in these provided the basis for the scientific papers they were to publish later.

Emery Chace only began his second career as curator of Marine Invertebrates after his retirement from the construction field at the age of 70. In 1954 the curatorial post was a part time position and with Mrs. Chace as his assistant and working only 100 hours a month, they embarked upon the staggering task of curating the A.M. Strong collection. Many of our older members will fondly recall the warmth and graciousness of Emery and Elsie Chace and their desire to be of help to those who visited the Marine Invertebrate Department or attended our Club meetings in the Museum where they acted as our sponsors.

Ten new species and one new genus were described for the Chaces and in 1960 they received the American Malacological Union, Western Division Honor Award of the Year for fifty years of distinguished work in conchology. Mr. Chace published over 26 papers in scientific journals both as sole author and as co-author with Mrs. Chace and others. A listing of his papers appears at the end of Conchological Reminiscences,* co-authored by the Chaces and published with the aid of the San Diego Society of Natural History on their retirement in 1967.

Mr. Chace described five new species, one of these co-authored with Mrs. Chace. The following are the species described by Emery Chace and the journals in which they were described.

Helminthoglypta traski misiona Chace, 1937. Holotype in SDNHM
A new race of Helminthoglypta traski from Lower California. Nautilus, Vol. 55(2):60-61.

Ammonitella yatesi allyni Chace, 1951. Holotype and Paratypes in SDNHM
A new subspecies of Ammonitella. Nautilus Vol. 64:122.

Ocenebra settoni Chace, 1958. Holotype in SDNHM
The marine molluscan fauna of Guadalupe Island, Mexico. Trans. San Diego Soc. Nat. Hist. 12: 319-332.

Nassarius howardae Chace, 1958. Holotype and Paratypes in SDNHM
A new mollusk from San Felipe, Baja California. Trans. San Diego Soc. Nat. Hist. 12: 333-334

Monadenia fidelis beryllica Chace & Chace, 1935. Holotype in SDNHM
A new variety of Monadenia fidelis from Curry County, Oregon. Nautilus 49: 48-49.

* Available in Club library

THE FESTIVUS

SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc., c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111

Vol. XII August 1980 No. 8

PROGRAM: David K. Mulliner will give a talk on photography of marine animals accompanying his presentation with a display of his photographic equipment and a selection of his slides. Photographing in the studio, microphotography and underwater photography will be discussed.

Details of the September 13 party will be discussed.

Date: August 21, 1980 Time: 7:30 P.M. Place: Room 104

CONTENTS

Exploring the underwater ancient sea cliffs--an ecosystem
MULLINER, DAVID K..... 93

A note on PAZIELLA HYSTRICINA (Dall, 1889)
D'ATTILIO, ANTHONY..... 95

Minute shells DAPHNELLA CLATHRATA Gabb, 1865.
HERTZ, JULES..... 97

Club news..... 101

EXPLORING THE UNDERWATER ANCIENT SEA CLIFFS

AN ECOSYSTEM*

DAVID K. MULLINER

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Ecosystems, regardless of size, consist of an assemblage of plants and animals linked by a fundamental need-- food. All of the energy (sunlight) and materials (minerals) originate basically in the physical environment. In the ecosystem living things absorb, transform, and circulate energy and matter and then release them to the environment again. The final release comes at death.

The ecosystem that is of greatest interest to me at this time is the rocky reef area off Point Loma on the outer edge of the giant kelp (Macrosystis pyrifera) beds. The reef is as shallow as 50 feet in some places and drops on the seaward side as sheer cliffs to depths of more than 100 feet. This area is known as "The Ancient Sea Cliffs" and it does look like the sea cliffs along the present day Point Loma shoreline. The sun's rays reach down tenuously to start the flow of energy into the abundant algae. Upwelling brings minerals up from the depths. The open sea sweeps against the cliffs bringing food (plankton) to the filter feeders. And so the physical environment and the organisms interact with each other to form the ecosystem.

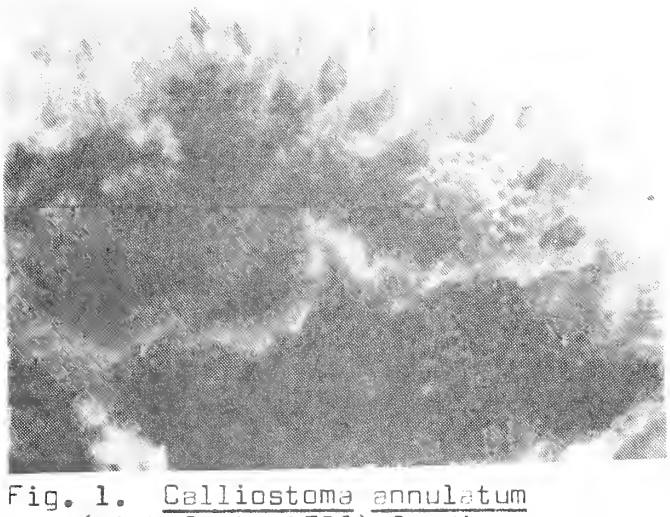


Fig. 1. Calliostoma annulatum (Lightfoot, 1786) feeding on bryozoans.

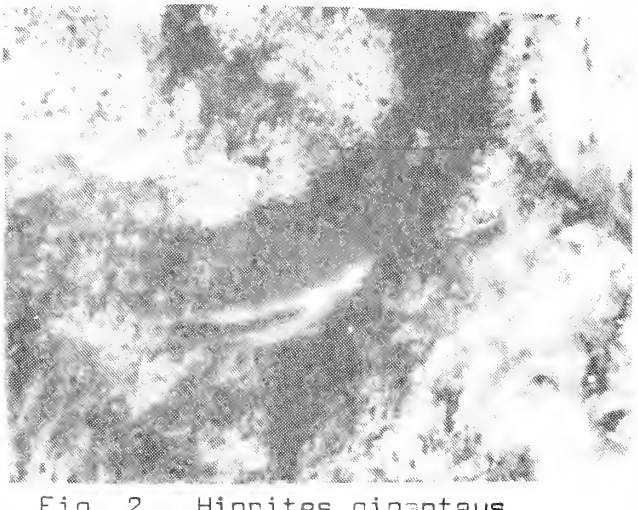


Fig. 2. Hinnites giganteus (Gray, 1825) in sea cliffs.

The diversity of life on the ancient sea cliffs is greater than most areas. It begins with the giant kelp, Pelagophycus porra, which reaches to the surface with its big buoyant ball and giant blades. The gastropod, Norrisia norrisi, can occasionally be found here, also the opisthobranch, Melibe leonina. As we swim down to the top of the reef we see the rocks covered with dozens of species of algae. Fish abound from the Cleaner Wrasse, Senorita, Sheephead, and Goby to the Rockfish, "Sebastes." Growing along the cliffs among the sea anemones, Corynactis californica, are the lacy bryozoans, Phidolopora pacifica. Living and feeding on the bryozoans is Calliostoma annulatum (Fig. 1). Hydroids, Aglaophenia and Tubularia, are found here and so are the many aeolid nudibranchs that feed on them. The

cliffs are an excellent habitat for the rock scallop, Hinnites giganteus (Fig. 2). Many sponges are found on the reef. They are the prey of the many Dorid nudibranchs such as Archidoris montereyensis, Cadlina marginata (Fig. 3), Anisodoris nobilis, and Dendrodoris fulva.

In the cliffs and along the base are many ledges and caves. Abalone can occasionally be found on the underside. Lobster (Fig. 4) hide in the caves along with Ling cod and Cabezon. Dive at night and you might see the Monkey-faced Eel.

Fig. 3. Cadlina marginata (MacFarland, 1905)

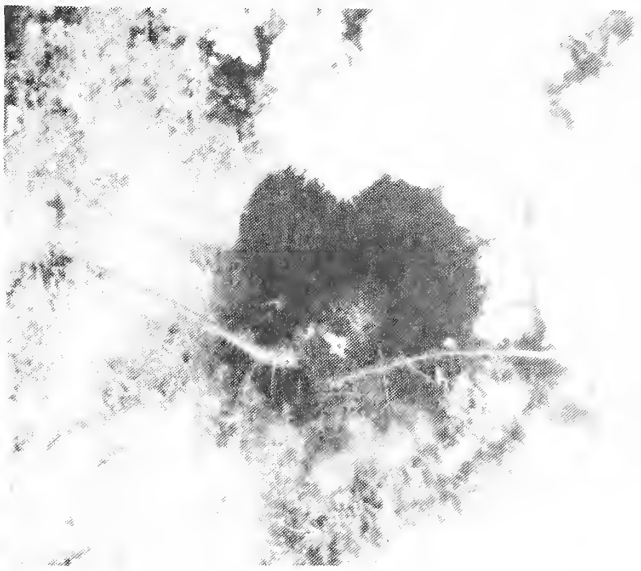


Fig. 4. Spiny lobster in crevice of cliffs

At the base of the cliffs are jumbled rocks, mud and sand. There are many open and barren areas in contrast to the high density of life on the reef. The water is much colder here; we are below the thermocline. Many gastropods are found in this area; Pteropurpura macroptera, Pteropurpura vokesae, Mitra idae, Kelletia kelletii, Bursa californica, Crassispira semiinflata, Megasurcula carpenteriana (Fig. 5), Megasurcula sternsiana etc.

Our air supply is running low so we swim back to the surface. Point Loma, two miles inshore, rises in steep cliffs 30 to 100 feet high and then slopes upward. It is off this part of San Diego that we make our weekend dives exploring, photographing and collecting.

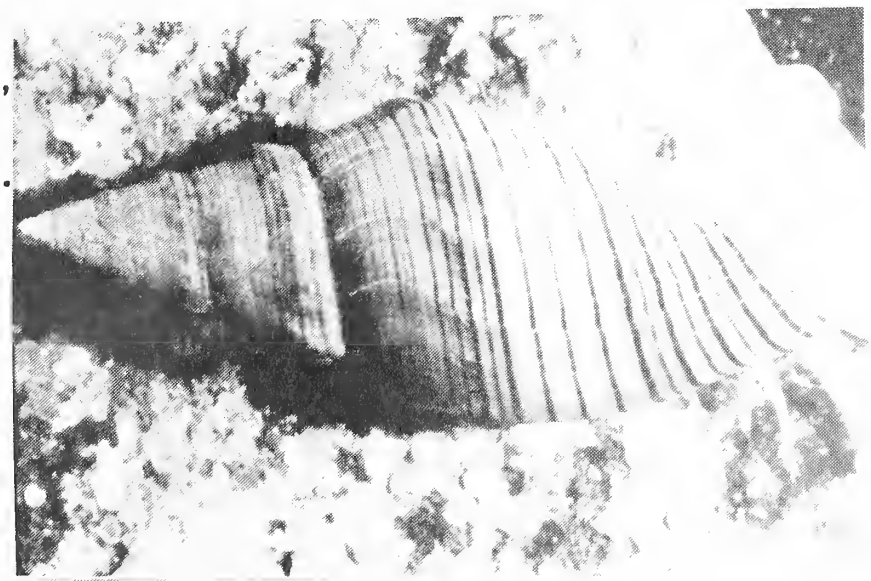


Fig. 5. Megasurcula carpenteriana (Gabb, 1865)

* From a talk given to the San Diego Shell Club by Dave Mulliner.

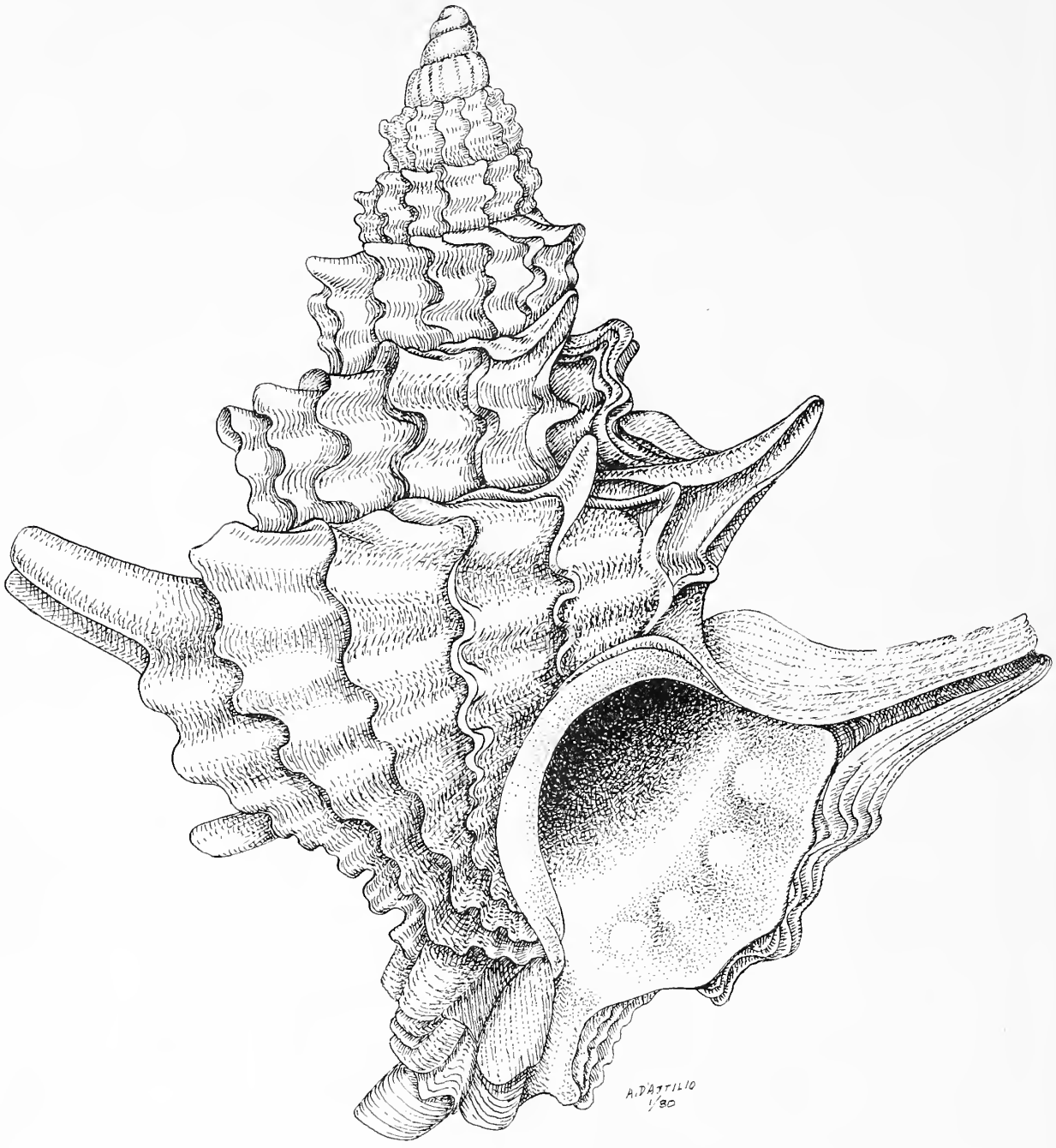


Fig. 1. Paziella hystricina (Dall, 1889)
SDNHM Lot #73599, dredged in 90 fms off
Barbados, West Indies. Length: 12 mm
Collector and Donor: Don Pisor

A NOTE ON PAZIELLA HYSTRICINA (DALL, 1889)

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

The original description of Paziella hystricina in the "Blake" report was based on specimens collected in deep water throughout the Antillean area: 148 fms. off Montserrat, 170 fms off Martinique, and 254 fms off Cuba. The species description is accompanied by an engraved illustration.

A number of specimens have been collected within the last two years by dredging in 90 fms off St. James Island, Barbados. Of two specimens I studied (SDNHM Lot #73599) one resembles the type figure in its spiral sculpture and the other shows more numerous primary spiral cords. Dall indicates the presence of "three principle posterior and several smaller anterior spiral cords." The specimen figured in this paper (Fig. 1) shows five primary cords and 4 or 5 diminishing spiral cords anteriorly. Although Dall states that the shell has nine whorls, the engraving shows 6 whorls plus the protoconch. The specimens I studied have five whorls in addition to those on the protoconch and although mature in appearance (length 12 mm), it would seem that a single additional whorl would bring the length of the shell up to 21 mm, the size of the type. The number of varices are 7 to 9. The apertural denticles are a strong feature of this species and may number from 4 to 6. None of the specimens examined retained the complete and perfect series of shoulder spines demonstrated by the type figure.

The shifting generic allocation of this species is apparent in the following synonymy:

Phyllonotus hystricinus Dall, 1889. (Plate legend reads Murex hystricinus).
Murex (Poirieria) hystricinus (Dall, 1889). Clench and Farfante, 1945.
Latiaxis hystricina (Dall, 1889). Vokes, 1971.
Poirieria (Paziella) hystricina (Dall, 1889). Radwin and D'Attilio, 1976.

Acknowledgments

Mr. Don Pisor of San Diego was a member of a group that dredged this material off Barbados and kindly donated these specimens to the collection of The San Diego Natural History Museum.

Literature Cited

Abbott, R. Tucker. 1974. American Seashells, Second Edition. The Marine Mollusca of the Atlantic and Pacific Coasts of North America. 663 pp., 23 pls., 6405 text illus. (p. 185)

Clench, William J. and I. Perez Farfante. 1945. The genus Murex in the Western Atlantic. Johnsonia. No. 17. pp. 1-58, 29 pls. (pp. 45-46)

Dall. William H. 1889. "Reports of the Results of Dredging...U.S. Coast Survey steamer "Blake"..." XXIX. Report on the Mollusca. Part 2. Gastropoda and Scaphopoda. Bull. Mus. Comp. Zool., Vol. 18, pp. 1-492. (p. 200, pl. 16 [not pl. 15] fig. 4)

Radwin, George E. and Anthony D'Attilio. 1976. Murex Shells of the World, An Illustrated Guide to the Muricidae. 284 pp. 32 pls., 192 text figs. (p. 85)

Vokes, Emily H. 1971. Catalogue of the genus Murex Linné (Mollusca & Gastropoda): Muricinae, Ocenebrinae. Bull. of Amer. Paleo. Vol. 61, #268. 141 pp. (p. 58)

MINUTE SHELLS

DAPHNELLA CLATHRATA GABB, 1865

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

Among some small shells recently obtained from Loyal J. Bibbey was a single specimen of *Daphnella clathrata* Gabb, 1865. The material had been trawled by Ronnie Nicols in nets in depths of 300 to 450 feet on the south side of the La Jolla Trench (off San Diego, California) from January to June 1979. The single specimen of *D. clathrata* is approximately 9.0 mm long and has a broken lip. Apertural and dorsal views are pictured in Figures 1 and 2. The shell is brown and has approximately 14 prominent as well as some intercalary cords on the body whorl. The axial sculpture is subdued on the body whorl but is more prominent on the posterior whorls. The presence of axial sculpture on the body whorl is readily apparent using flat lighting (Figure 3). The differences in appearance under flat and normal lighting are significant and may contribute to some identification problems in literature where the method of photography has varied from normal lighting and has not been adequately explained. Conversely, the use of special lighting effects can be beneficial in highlighting specific shell features that would normally be difficult to picture. The excellent photographs were taken by David K. Mulliner, Festivus staff photographer.

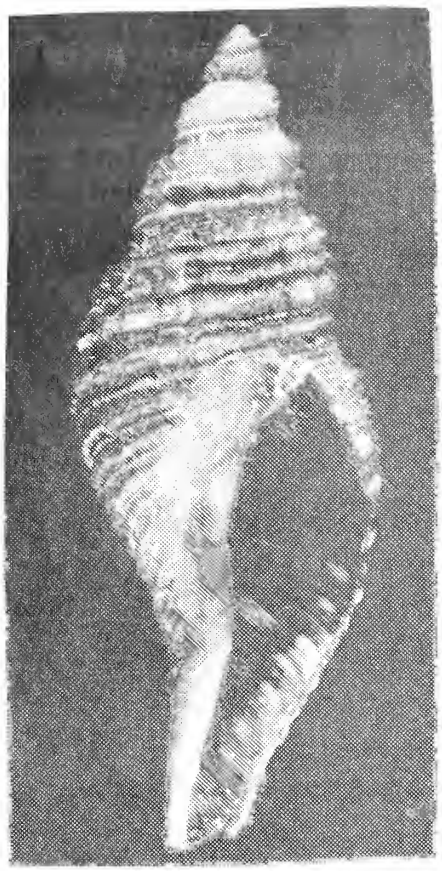


Fig. 1. *D. clathrata* apertural view
Length: approx. 9 mm
normal lighting

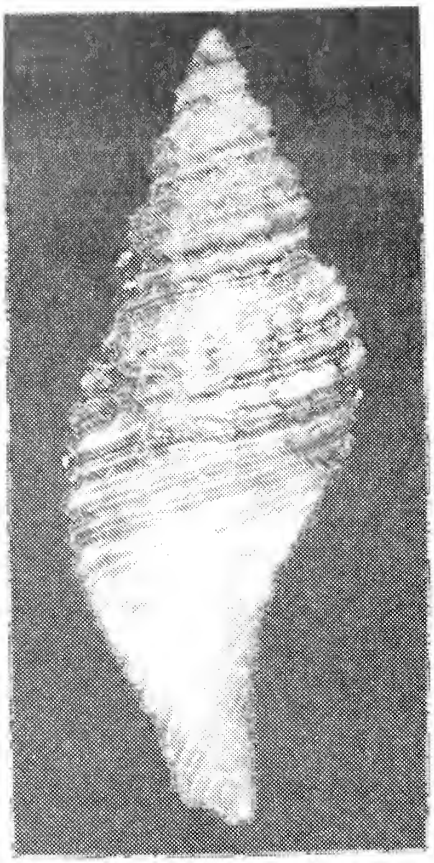


Fig. 2. *D. clathrata* dorsal view, same shell as in Fig. 1.
normal lighting

Fig. 3. *D. clathrata* apertural view, same shell as in Fig. 1.
flat lighting

Identification of the shell was confirmed by comparison with three lots of D. clathrata in the San Diego Natural History Museum. SDNHM Lot #22885 contains 4 specimens from the H.N. Lowe collection obtained in 30 fathoms off Newport, Ca. The largest shell in this lot is 13 mm. SDNHM Lot #22882 is also from the H.N. Lowe collection. This lot consists of 5 shells varying in size from 7 to 14 mm and in color from beige to light brown. They were collected in 50 fathoms off Catalina Island, Ca. The third lot, from the A.M. Strong collection (SDNHM #40843), contains 4 shells collected in 30 to 40 fathoms off Catalina Island, Ca. The largest shell in this lot is 16 mm, and it has strongly rounded, closely spaced cords on the body whorl. In fact, there are significant differences in sculpture of the shells within lots and from lot to lot. The shells of Lot #22882 all have heavier cording than the specimen figured here. Some have very heavy rounded cords on the body whorl with finer rounded cords between the heavier ones. Some of the cords are randomly beaded and a cursory examination of the specimens gave the impression that the shells had some white cords. Some of the shells in both lots #22882 and #22885 have cords with alternating color segments of white and beige, thus giving an outward appearance of having some white cords. D. clathrata was previously figured by Grant and Gale (1931).

Hinds (1844) named the genus Daphnella and distinguished shells in this genus from other small Pleurotomaceae by stating that the Daphnella had "a thin fragile structure, elongated in form, the outer lip acute, and separated from the last whorl so as to leave a sinus, aperture of a lengthened oval, scarcely any canal, and with the surface usually transversely striated." Gabb (1865) described the species D. clathrata as follows: "Shell small, fusiform, thin, aperture longer than the spire; nuclear whorls three or more, obliquely truncated above, convex below, this truncation is partially obsolete on the last whorl; surface closely clathrate, except on the lower part of the last whorl where the radiating lines become obsolete; aperture large, columella somewhat twisted, slightly encrusted; outer lip thin, acute, posterior sinus moderately deep and narrow, adjoining the suture and angular at its upper corner; color brownish white with minute brown spots sparsely scattered, usually placed on the larger of the revolving ribs."

Cooper (in Gabb, 1865) stated the type locality as Santa Catalina Island in 60 fathoms and that the type was located in Survey Cabinet, Mollusca, No. 1053. Grant and Gale (1931) state that the type is housed at the University of California (?). Dall (1921) states the range as San Miguel Island to San Diego and Cortez Bank, California. This range is repeated by Oldroyd (1927), Grant and Gale (1931) and Abbott (1974). Burch (1946) notes the collections of Lowe off Catalina Island and off Newport Beach and collecting by Burch in 100 fathoms off Redondo Beach, California.

Daphnella has traditionally been placed with Mangelia in the family Turridae because they both lack an operculum. Powell (1966) states that "The operculum is either absent or reduced to vestigial size in the Mangellinae and Daphnellinae." The most distinguishing feature for the Daphnella is the protoconch. Powell (1966) states "The protoconch seems to be a valuable aid in the segregation of generic or subgeneric groups, but only one, the diagonally cancellate 'sinusigera' is narrowly diagnostic, being confined to the Daphnellinae and the Thacheriinae, always in association with a reversed L-shaped sinus or modification of it." McLean (1971) states that "shallow water eastern Pacific genera with diagonally cancellate protoconchs are Daphnella Hinds, 1844; Rimosodaphnella Cossman, 1915; Philbertia Monterosato, 1884; and the new genus Truncadaphne."

The protoconch of the specimen trawled off the La Jolla Trench is illustrated in a 50X camera lucida drawing by Anthony D'Attilio (Figure 4). The first nuclear whorl has 6 raised nodulose (very fine) striae. A greatly enlarged view of this detail is also shown. The second and third whorls of the protoconch show axial raised ridges on the upper portion of the whorls and diagonally passing ridges below the shoulder resulting in excavated areas between. A greatly enlarged detail of this clathrate (latticed) structure is also shown in Figure 4.

This protoconch is similar to that of Daphnella cancellata Hutton, 1878 illustrated by Powell (1966). It is interesting that such a distinguishing characteristic as the Daphnella protpconch was not mentioned in Hinds' description of the genus nor Gabb's description of the species D. clathrata.

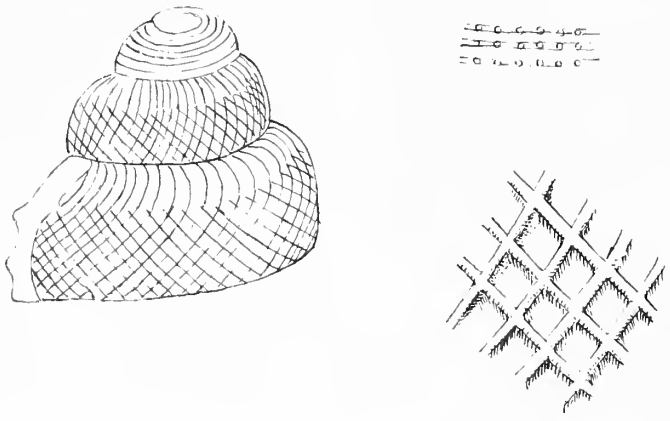


Fig. 4. Protoconch of D. clathrata
Drawing at 50X, details of nodulose striae and latticed sculpture greatly enlarged.

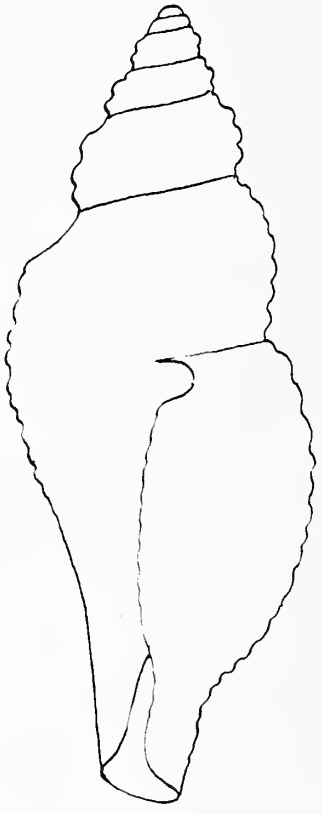


Fig. 5. Drawing of D. clathrata showing distinctive sinus. magnification 12X, SDNHM Lot #22882 Length: approx. 7.5 mm.

The chipped lip on the specimen trawled south of the La Jolla Trench prevented the figuring of the species' distinctive sinus. Figure 5 is a 12X drawing by Anthony D'Attilio of a D. clathrata specimen from SDNHM Lot#22882. It shows the posterior sinus adjoining the suture typical of the reversed L-shaped sinus of Daphnellinae.

Grant and Gale (1931) have stated that "Daphnella clathrata is the only characteristic California species." They believed that another California species, Daphnella fuscoligata Dall, 1871, was not a true Daphnella but a Mangelia and the species name M. fuscoligata was preoccupied. They therefore renamed the species Mangelia crassaspera. Abbott (1974), however, lists D. fuscoligata as a valid species with M. crassaspera Grant and Gale, 1931 as a synonym. McLean (1978) placed the species in the genus Clathromangelia Monterosato, 1884 thus making the name Clathromangelia fuscoligata (Dall, 1871). This species will be the subject of a future Festivus article.

Grant and Gale (1931) indicate that D. clathrata is very similar to the Caribbean species, Daphnella lymneiformis (Kiener, 1839-40) and that Pleurotoma lymneiformis is considered the type (by subsequent designation, Herrmannsen, 1847) of the genus Daphnella Hinds, 1844. Grant and Gale also considered D. clathrata very similar to D. bartschi Dall, 1919 found in the Panamic region, except that D. bartschi has a shorter aperture and apparently a thicker shell. Further work on the Daphnella might show that D. lymneiformis is an analog of either D. bartschi or D. clathrata.

Acknowledgments

I am indebted to Loyal J. Bibbey for the shell and collecting data, to David K. Mulliner for the high magnification photographs and comments on the effects of lighting, and Anthony D'Attilio for the fine drawings and commentary on labial sinus and protoconch.

Literature Cited

Abbott, R. Tucker. 1974. American Seashells, Second Edition. Van Nostrand Reinhold. 663 pp. 24 pls.

Burch, John W. Ed. 1946. Distributional list of the West American marine Mollusca from San Diego, California to the Polar Sea. [Extracts from the] Minutes of the Conchological Club of Southern California, Part II, Vol. II, No. 62, p. 31 (August).

Gabb, Wm. M. 1865. Proc. Cal. Acad. Sci. Vol. 3, p. 185.

Grant, U.S., IV and H.R. Gale. 1931. Catalogue of the marine Pliocene and Pleistocene Mollusca of California and adjacent regions. Mem. San Diego Soc. Nat. Hist., Vol.1, pp. 1-1036, 15 figs., pls. 1-32 (Nov. 3) [p. 542, pl. 25, figs. 23, 24].

Hinds, R.B. 1844. Zool. Voy. Sulphur, Mollusca. p.25.

McLean, J.H. 1971. A revised classification of the family Turridae with the proposal of new subfamilies, genera, and subgenera from the eastern Pacific. Veliger. Vol. 14(1): 114-130. 4 pls. (July 1)

McLean, J.H. 1978. Marine shells of Southern California. Los Angeles County Museum of Natural History. Science Series 24, Zoology, No. 11, 104 pp. 54 figs., Revised Edition (March 20).

Oldroyd, Ida S. 1927. The marine shells of the West coast of North America, Stanford Univ. Pub., Univ. Ser., Geol. Sci., Vol. 2, Pt. 1, p. 150.

Powell, A.W.B. 1866. The molluscan families Speightiidae and Turridae. Bull. Auckland Inst. and Mus. No. 5, 184 pp., 23 pls. (Nov. 1).

Dr. Hans Bertsch has resigned from his position as Curator of Marine Invertebrates at the San Diego Natural History Museum. He has accepted a position as Science Education Advisor at the Waikiki Aquarium in Hawaii. We wish him success in his new position. Anthony D'Attilio is now Acting Curator in the Department of Marine Invertebrates.

FROM THE MINUTES

San Diego Shell Club Meeting - 17 July 1980

CAROL BURCHARD

Vice President David Mulliner called the meeting to order at 7:55 P.M. and guests and new members were introduced.

Anthony D'Attilio was the speaker for the evening. Tony is a distinguished artist as well as malacologist who has been with the San Diego Natural History Museum for the past eleven years. Tony accompanied his talk on radula morphology with his drawings of radulae as well as electron micrographs and slides of the shells discussed.

During the refreshment break there was viewing of the beautiful Murex brought for exhibit and shell trading. Also on exhibit was the Festivus display which had been prepared for the W.S.M. meeting in June.

The September party will be held on Saturday the 13th and the theme will be East Indian. Details at the August meeting. The Club requires a host for the party. If you are willing to let the Club use your home or garden, please contact a Board member.

The meeting ended with Tony D'Attilio showing slides of some of his his paintings. It was a delight to view them. The meeting was adjourned at 9:20 P.M.

NEW MEMBERS

Brosius, Doris & George, #159 14 0746. Dep. Mail Sect., Box 11, APO San Francisco, Ca. 96301

Martin, Cynthis & Philip "Moki", 1117 G Ave., Coronado, Ca. 92118. 435-3214

McPeak, Ron, 7989 La Brusca Way, Carlsbad, Ca. 92008. 942-3489

Sears, Mr. Cody, 12875 Caminito Del Canto, Del Mar, Ca. 92014. 455-6322

Winkler, Jutta, 1657 Kearsarge Rd., La Jolla, Ca. 92037. 459-2484

CHANGE OF ADDRESS

Mabry, Billee & Don, 1233 Via Monte Vista, Palm Springs, Ca. 92262.

Bertsch, Judith & Hans, c/o Waikiki Aquarium, 2777 Kalakaua Ave. Honolulu, Hawaii 96815

Temporary address --until October

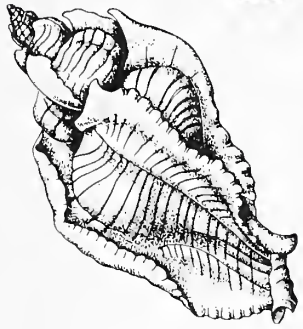
Bradner, Marge & Hugh, University of Hawaii, High Energy Physics, DUMAND, 2505 Correa Rd., Honolulu, Hawaii 96822

FOR YOUR INFORMATION

Under the terms of the Balboa Park Commision and the San Diego Botanical Foundation, under whose auspices we meet in Room 104 of the Casa Del Prado free of charge, we are not permitted to sell or make a profit on anything while in their building. (But trading is most certainly permitted before the meetings and during the refreshment break).

Shell desk diaries will be available at the September meeting @ $4.25. Notify Wally Robertson if you want to order any calendars @ $3.00. He will have to place a new order.

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.
CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc.
c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111.

Vol. XII September 1980 No. 9

COME TO THE ANNUAL SEPTEMBER PARTY
(Saturday evening, September 13, 1980)

The party will have an East Indian theme and will be held at the home of Margaret and Dave Mulliner. The party will begin at 6:00 P.M. See map on last page of this issue for details and directions. There will be no regular meeting this month.

CONTENTS

Notes on TURRITELLA LEUCOSTOMA Valenciennes, 1832
HERTZ, CAROLE M..... 103

Notes on gastropod radulae
D'ATTILIO, ANTHONY..... 110

Notes on CALLIOSTOMA VARIEGATUM Carpenter, 1864
HERTZ, JULES..... 115

Club news..... 117

NOTES ON TURRITELLA LEUCOSTOMA VALENCIENNES, 1832

CAROLE M. HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

Class Gastropoda
Family Turritellidae Woodward, 1851
Genus Turritella Lamarck, 1799

Turritella leucostoma Valenciennes, 1832

Turritella leucostoma VALENCIENNES, 1832. in Humboldt and Bonpland, Voyage aux regions equinoxiales du nouveau continent fait en 1799-1904. Vol. 2, Zool. pp. 275-276. KIENER. 1843-1844. Icon. des coquilles vivantes..., p. 9, pl. 6, fig. 2. MERRIAM. 1941. U.C. Pub. Bull. Dept. Geol. Sci.Vol. 26, p. 56. pl. 38, fig. 11. HERTLEIN & STRONG. 1955. Bull. Am. Mus.Nat. Hist. Vol. 107(2): 271-273. KEEN. 1971. Sea shells of Tropical W. America. p. 392, fig. 440. ABBOTT. 1974. American seashells, 2nd ed. p. 95.

Turritella tigrina KIENER, 1843-1844. Icon. des coquilles vivantes... p. 29, pl. 4, fig. 2. REEVE, 1849. Conchologia iconica. Vol. 5, Sp. 8, pl. 3, fig. 8. TRYON, 1886. Manual of conch. Vol. 8, p. 199, pl. 62, figs. 65 & 66.

Turritella cumingii REEVE, 1849. Conch. iconica. Vol. 5, Sp. 13, pl. 4, fig. 13.

Turritella dura MÖRCH, 1860. Malakozool. Blatter... Vol. 7(2):78. KEEN, 1966. Occas. Papers Cal. Acad. Sci. No. 59, p. 22-23, figs. 27a,b,c.

This second in a series of articles on Turritella found in the Gulf of California, Mexico, treats the distinctive species, Turritella leucostoma Valenciennes, 1832. Valenciennes described but did not figure the species which he called popularly, "Turritella a bouche blanche" or white mouthed Turritella. His original description was based on a 4 inch specimen from Acapulco, Mexico.

In 1843 Kiener described and figured T. tigrina (Fig. 1) and also figured and described what he considered was T. leucostoma Val., 1832. Later workers Merriam (1941-42), Hertlein & Strong (1955), Keen (1971) and Abbott (1974) considered T. tigrina and T. leucostoma conspecific.

In 1849 Reeve "redescribed" T. leucostoma using a different figure than Kiener (Fig. 2). He also "redescribed" and refigured T. tigrina and in the same volume named and figured a new species, T. cumingii (Fig. 3) from Panama. The figures of T. tigrina and T. cumingii figured by Reeve have imperceptible differences; T. cumingii is merely a more slender shell than T. tigrina. Merriam (1941-42) states that, "T. leucostoma Val. (tigrina Kiener, cumingii Reeve) seemingly represents a distinct stock which may have appeared in Pacific North American waters late in the Cenozoic." Hertlein & Strong (1955) state that "There is variation in the shape and ornamentation of the whorls [of T. leucostoma] but the characteristic features of this species are usually defined and quite different from those of any other west American Turritella." Keen (1971) and Abbott (1974) also consider T. cumingii to be a synonym of T. leucostoma.

In 1860 Mörch named but did not figure a species he called T. dura. After studying the four syntype specimens of T. dura in the Copenhagen Museum, Keen (1966, Fig. 27a,b,c) considered T. dura a synonym of T. leucostoma (Fig. 4).

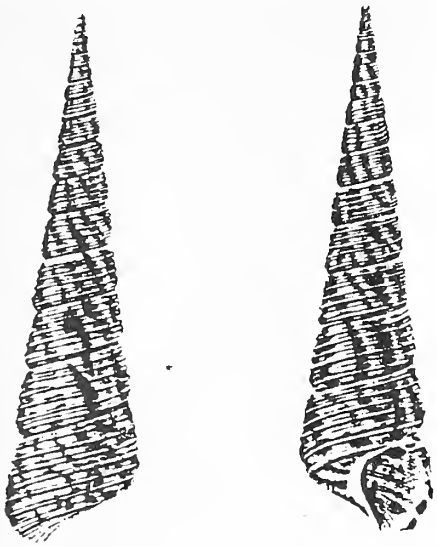


Fig. 1. T. tigrina Kiener, 1843 xerox copy of original Pl. 4 No. 2 in Kiener (1843).

Fig. 2. xerox copy of Pl. II No. 5 from Reeve (1849) (Reeve's conception of T. leucostoma Val.).

Fig. 3. T. cumingii Reeve, 1849 xerox copy of original Pl. IV No. 13 from Reeve (1849).

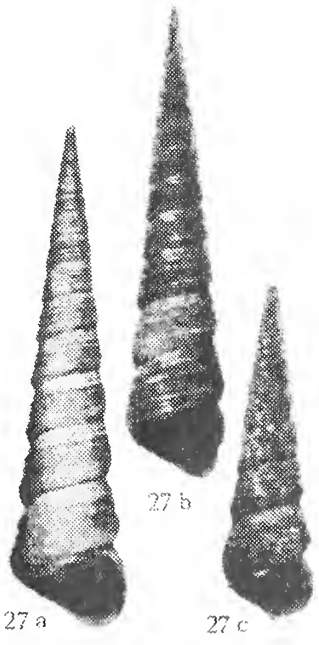


Fig. 4. T. dura Mörch, 1860 halftone of photo of syntypes of T. dura in the Copenhagen Museum in Keen (1966).

T. leucostoma is easily recognized and separated from other species of Turritella occurring in the Gulf of California though there is variation among individuals of the species. The sculpture of T. leucostoma is essentially an unchanging feature from the first whorl of the teleoconch to the body whorl with the exception of a slightly more prominent central cord on the first 6 to 9 whorls of some specimens. The whorls are turret-shaped, contracted posteriorly, and projected out anteriorly; some specimens showing a more rounded periphery than others. Figures 5-10 are all specimens of T. leucostoma and illustrate the variability within the species.* While in juvenile specimens the whorls are usually angulate throughout the length of the shell, in the adult the later whorls are sometimes more rounded at the periphery as in Figure 7. Figure 8 shows a change in the spiral sculpture on the body whorl after the animal's shell was injured.

The length of mature shells studied varied from approximately 59 mm (SDNHM Lot#28219 from Mazatlán, Sin. Mex., Fig. 6) to 139 mm (SDNHM Lot#19583 from Magdalena Bay, B.C., Mex.). Mature shells also varied from very slender to robust. A specimen from San Felipe, B.C., Mex. (Fig. 10) is a very slender shell of 120 mm. The number of whorls per inch is inconsistent from specimen to specimen and not a reliable diagnostic feature.

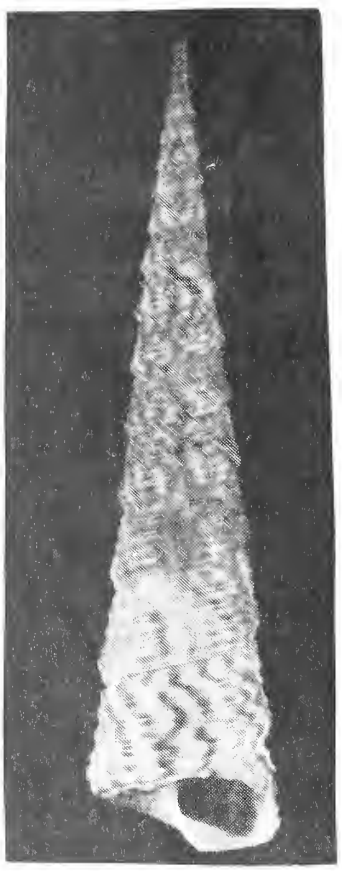


Fig. 5. T. leucostoma
SDNHM Lot #28217
(Kino Bay, Son., Mexico)
Collector: H.N. Lowe
Length: 64 mm (18 whorls)

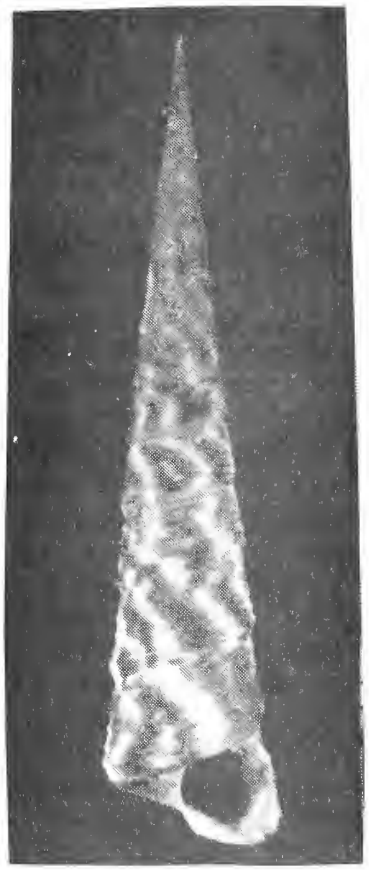


Fig. 6. T. leucostoma
SDNHM Lot #28219
(Mazatlán, Sin., Mexico)
Collector: H.N. Lowe
Length: 59 mm (17 whorls)

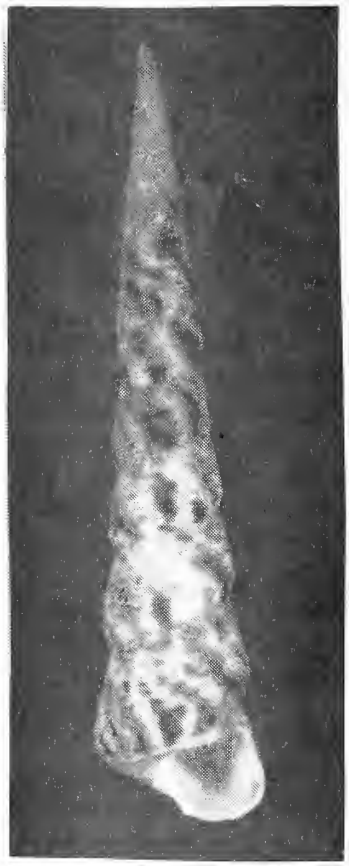


Fig. 7. T. leucostoma
SDNHM Lot #60581
(Kino Bay, Son., Mexico)
Collector: A.M. Strong
Length: 75.5 mm (16 whorl

Fig. 8. T. leucostoma
SDNHM Lot#28222
(San Juan Del Sur, Nicaragua)
Collector: H.N. Lowe
Length: 100 mm (19 whorls)

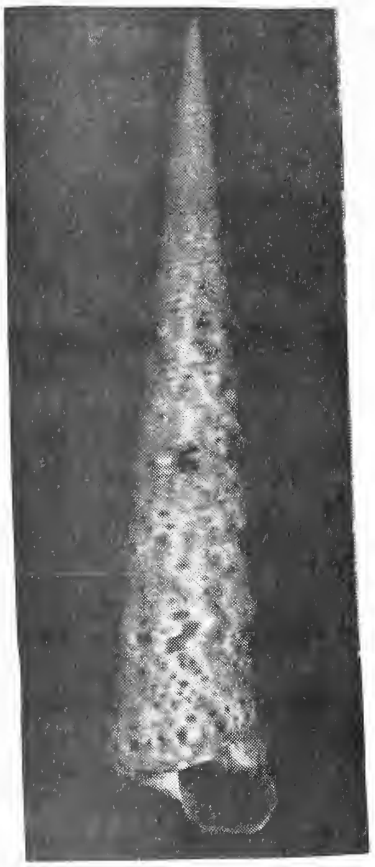


Fig. 9. T. leucostoma
SDNHM Lot #44395
(Concepción Bay, B.C., Mexico)
Collector: Dr. Lindsey
Length: 104 mm (18 whorls)

Fig. 10. T. leucostoma
Gemmell Collection
(San Felipe, B.C., Mex.)
Collector: Joyce Gemmell
Length: 118 mm (25 whorls) dead collected.

* All specimens photographed had the nucleus decollated.

Each whorl has between 4 and 6 prominent spiral cords. Most specimens examined have from 2 to 4 rows of minor cords between the major ones. Some show no minor cords, some show some double rows of minor cords between the major ones (Fig. 9), and in some specimens the minor cords approach the strength of the major ones. There is no axial sculpture. Figure 11 is a scanning electron micrograph (SEM) of a portion of the body whorl and the penultimate whorl of the juvenile specimen (15 mm long, 11 whorls) in Figure 12. The SEM shows a whorl of 5 strong primary cords and no developed axial sculpture. In this specimen faint minor cords can be seen.

The spiral cords often appear nodulose but are actually smooth. The bumpy appearance is the result of the highlights of the flammulose color pattern (Figs. 8 & 9). The "neatly articulated ridges" described and figured in Reeve (1849) [Fig. 2], would have been a result of this misleading effect provided by the color patterning. The patterning ranges from a light orange-brown to a deep chocolate color. The interior of the rounded aperture is white. However, the exterior color often shows through giving the interior a brown cast or showing the flammulose marking of the exterior.

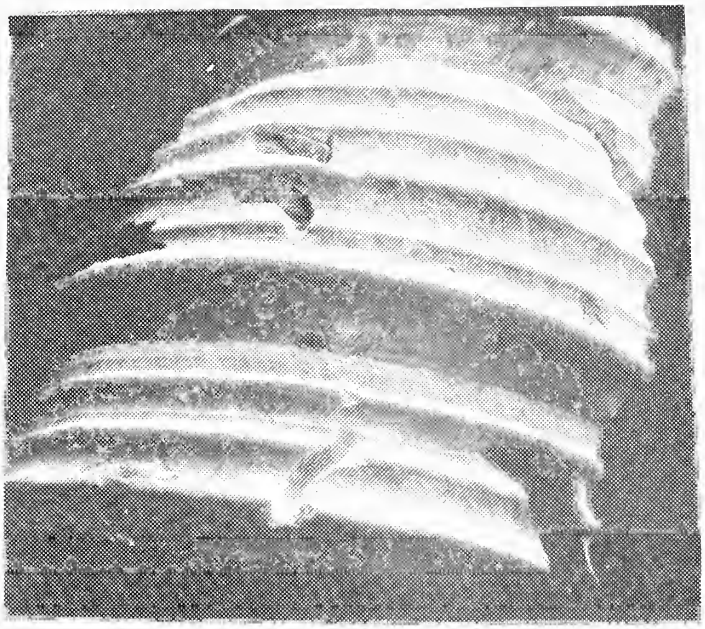


Fig. 11 SEM at 20X of penultimate whorl and portion of body whorl of the juvenile T. leucostoma pictured in Fig. 12.

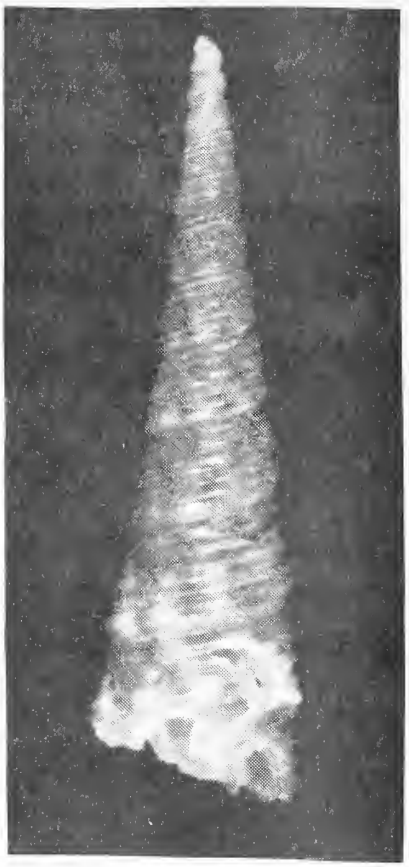


Fig. 12 T. leucostoma
SDNHM Lot #28217
(Kino Bay, Son., Mex.)
Collector: H.N. Lowe
Length: 15 mm(11 whorls)

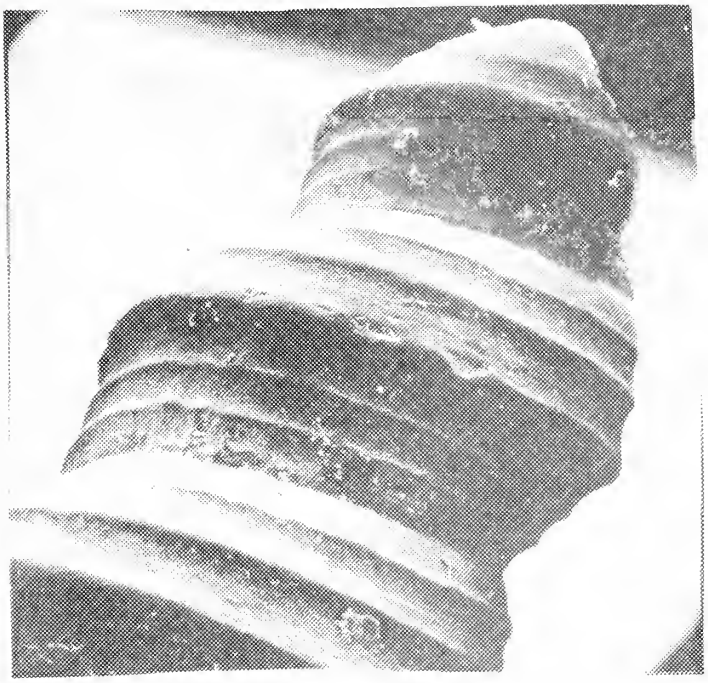


Fig. 13 SEM at 90X of first whorls of juvenile specimen in Fig. 12.

More than 100 specimens were studied and none had the protoconch intact. Merriam (1941) states that, "the calcareous protoconch of Turritella is essentially the same in all species examined, and is similar to that of other genera - for example, some of the Cerithiidae. This structure is too simple and generalized to be of value for purposes of taxonomy." Interestingly he notes that the turbinate protoconch is often decollated as the shell matures and that the breakage is repaired by the posterior mantle tip which secretes a septum to seal the break. Marwick (1957) and Garrard (1972) however, consider the protoconch as criteria for classification of the family. Figure 13, an SEM at 90X, details the early whorls of the decollate juvenile specimen in Figure 12.

It illustrates the more prominent cord on the first 6 to 9 whorls of some specimens mentioned earlier.

Very little has been written about the operculum in the Turritellidae. Merriam (1941) gives the following generalized description. "The operculum is a horny, circular, multispiral plate with a central nucleus and fimbriated edge; it closely resembles the operculum of Potamides." Fretter and Graham (1962) add that the operculum is edged with bristle-like extensions as in some vermetids." In their discussion of feeding they add that T. communis partially withdraws its head and foot during feeding "and the operculum [is] brought forward so that its spinous edge acts as a subsidiary filter...." Neither Graham (1938) in his work on food collecting in T. communis nor Yonge (1946) on the life habits of T. communis mention the operculum in this regard.

In Figure 14, drawn at 6X, the number of spiral rings of the operculum of a mature specimen is shown diagramatically. The operculum grows in a succession of spirals attached to the inner layer which is attached to the foot. The edges of these

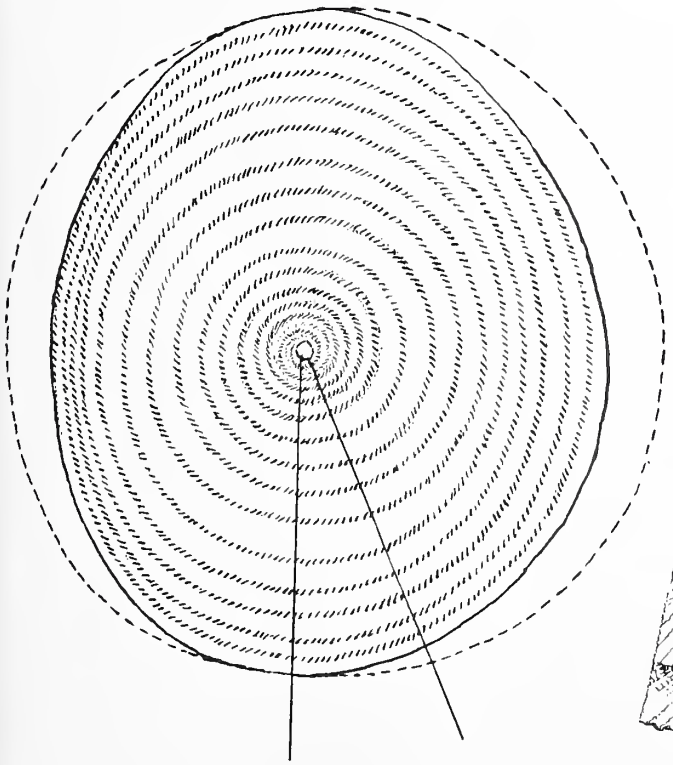


Fig. 14 Operculum of T. leucostoma at 6X (Operculum bent in drying and appears ovate. Dotted lines show circular shape).

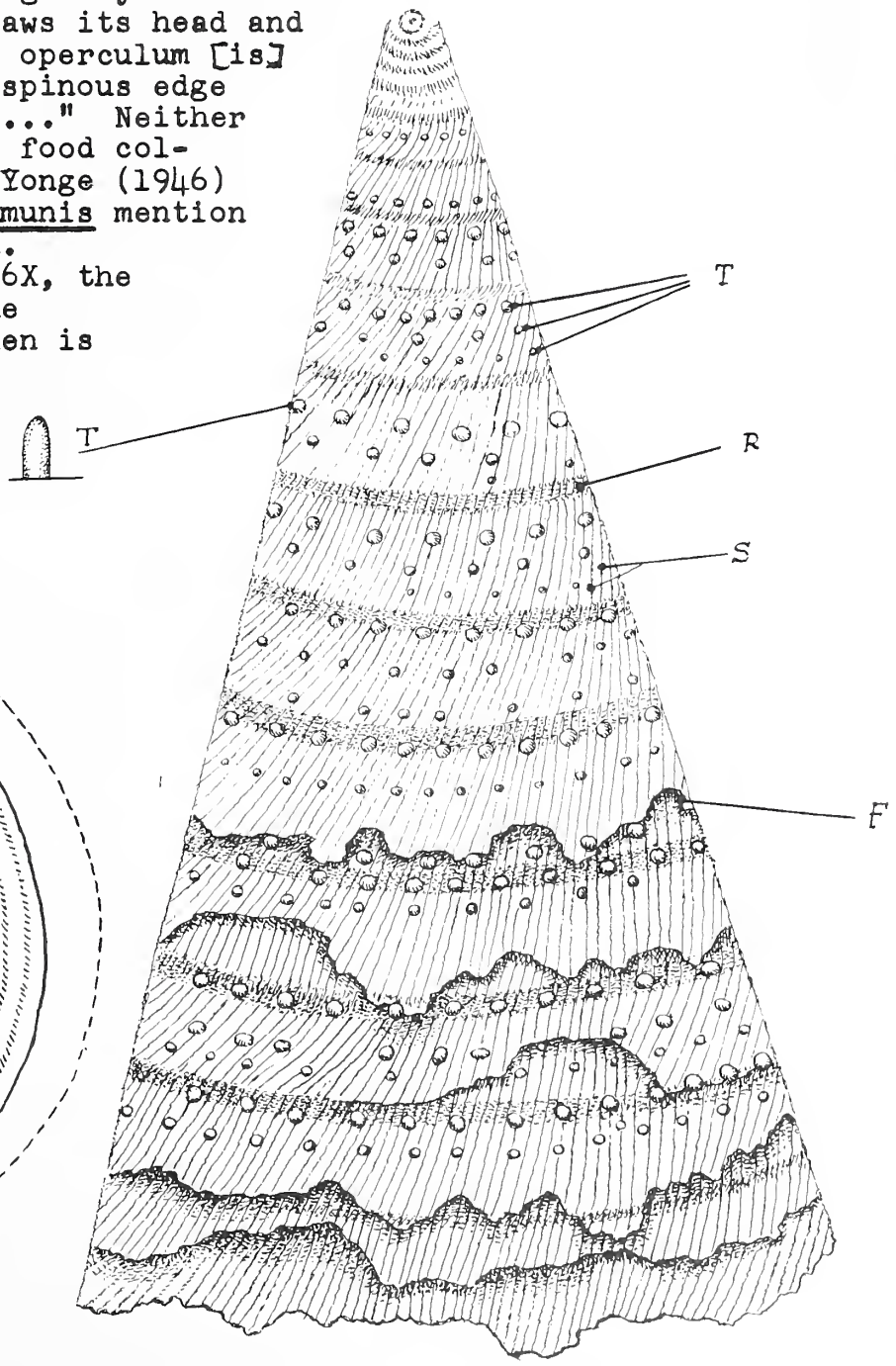


Fig. 15 Detail of segment of operculum drawn at 25X.

spirals, or bands, often separate from the succeeding spiral forming an irregularly fimbriated, or frayed, edge. Figure 15 shows a segment of the operculum of T. leucostoma drawn at 25X. It indicates the rows of primary, secondary, and tertiary tubercles (T) in relation to the spiral rings (R). The tubercles are conically shaped unless broken and are a dark brown color. The diagonal striations (S) on the bands do not radiate from the nucleus but follow the direction of growth. The lines indicated are the dividing lines of the raised ridges. (F) represents the fimbriated, or frayed, edges of the bands.

The specimens studied were from the San Diego Natural History Museum (SDNHM), California Academy of Sciences (Cal. Acad.), the Los Angeles County Museum of Natural History (LACM), and local private collections. The specimens studied ranged from Punta Abreojos (LACM Lot #71-4 on the outer coast of Baja California, Mexico) to Panama (Cal. Acad. Lot #3416 and Lot #46549 [Coiba Is.]), and northward through the Gulf of California to San Felipe, Baja Calif., Mexico (Mulliner collection, 1 specimen, subadult, live collected, -4.0' tide, November 13, 1966). Two adventitious specimens were noted from "238° True, 3½ miles off Huntington Beach, California 33°37'50"N, 118°04'17"W, from 18 fathoms on green mud and fine sand, February 16, 1941" (LACM Lot #AHF235-41). The reported range for this species (Keen, 1971) is from Cedros Island, Baja California, Mexico to Panama and south through the Gulf of California.

Acknowledgments

I am indebted to Anthony D'Attilio for his drawings of the operculum, for his discussion of its morphology and for his critical reading of the paper. I want to thank David K. Mulliner for the many hours he spent photographing the majority of the specimens illustrated, Barbara W. Myers for the photograph of the specimen in Figure 10, and Robert Pettyjohn for the scanning electron micrographs. I am grateful to Dr. Barry Roth of the Cal. Academy for his gracious help and to Dr. James H. McLean, Gale Sphon, and Patrick LaFollette for making the LACM collection available to me. My thanks to librarians Judith Dyer and Carol Barsi of the SDNHM for their help in locating obscure publications and to Margaret Mulliner and Joyce Gemmell who permitted me to examine specimens in their collections. My appreciation to Jules Hertz who critically read and proofread the article.

In addition to the literature cited in the synonymy, the following works were also cited.

Fretter, v. & A. Graham. 1962. British Prosobranch Molluscs. Ray Society. 755 pp.

Garrard, T.A. 1972. A revision of Australian Recent and Tertiary Turritellidae (Gastropoda: Mollusca). J. Malac. Soc. Austral. Vol. 2(3):267-338.

Graham, A. 1938. On a ciliary process of food-collecting in the gastropod Turritella communis Risso. Proc. Zool. Soc. London. Vol. 108, Ser. Z. pp. 453-463.

Marwick, J. 1957. Generic revision of the Turritellidae. Proc. Malac. Soc. London. Vol. 32(4): 144-166.

Yonge, C.M. 1946. On the habits of Turritella communis Risso. J. Mar. Biol. Assn. U.K.. 26: 377-380.

NOTES ON GASTROPOD RADULAE

ANTHONY D'ATTILIO*

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California 92112

Study of the gastropod radula begins with developing a technique for extracting the radula out of the animal's body, cleaning and then mounting the radula for microscopic viewing. The dissection becomes especially troublesome when the soft parts of the animals' bodies are surrounded by a hard shell. Various methods of softening or rotting the tissue have been used. The shell can be broken open, or the soft parts can be carefully teased out. For those species without a shell, or when the animal has been preserved with the head extended, a simple lateral incision opens the buccal mass to extraction with forceps. The ribbon then can be isolated and cleaned by soaking in a 5% solution of sodium hypochlorite which will dissolve the surrounding animal tissue. This chemical is sold commonly in food chain stores as Chlorox or by some other trade name. If the specimen is very small, the entire soft parts can be placed in sodium hypochlorite until the radula can be lifted out. Because of the corrosive effects of the chemical, cleaning must be continually monitored or the entire radula can be dissolved. Mounting of the radula on a slide has been explained numerous times in the literature. See Radwin, G.E., 1969. Technique for extraction and mounting of Gastropod radulae. Veliger, Vol. 12(1): 143-144. for further information.

The study and illustration of the radula may be simple or complicated depending on the morphology of the species being examined. For example, a simple radula in the Muricidae subfamily Muricinae, will have a flat rachidian or central tooth, only weakly arched so that there is very little variation of views in the form being studied. In 2 other subfamilies of Muricidae the rachidian tooth will not lay down flat because of its comparative thickness and strong sculpture in 3 dimensions. Not only is the rachidian tooth strongly arched but it is relatively thick for its width and height. The result is that the teeth will have a tendency to rest in all sorts of positions which makes it difficult to understand the perspective of each view. Figure 1 shows a typical radula of a Murex s.s. It is a matter of personal

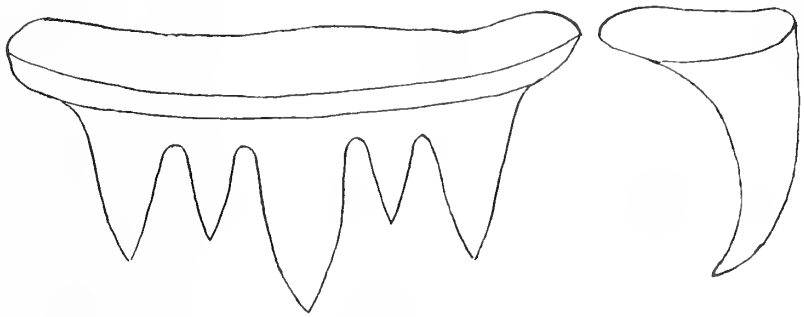


Fig. 1. Radula of Murex tribulus Linne, 1758

* Adapted from a paper by Anthony D'Attilio and Hans Bertsch entitled, "Studying Radular Morphology," and presented at W.S.M. 1980 by Anthony D'Attilio.

judgement then to decide what the most understandable view or aspect of the individual tooth is and then search for any resting in the position required. However, in our view, there is no one perspective which explains the entire morphology. Radular teeth are components of a complex, intricate, moving system. The relative position of teeth at rest inside the mouth is different than the position of the teeth in relation to each other when the radula is used in feeding. For this reason an understanding of such teeth is best obtained by showing as many views as possible-- lateral, dorsal, ventral, and whatever other view is available on the slide.

Another disconcerting problem arising in the study of small radulae having a strong three-dimensional aspect is that often the whole tooth cannot be brought into focus in one plane. Since some portion of the tooth will not be in focus or even visible, the microscope lens has to be shifted up or down to bring the different areas or contours of the teeth into focus. If one is using a camera lucida to make an enlarged illustration, adjustments have to be made constantly in the drawing because the subject is made larger or smaller as the lens is moved up or down. Thus, you cannot pick up a line and continue your drawing without "fudging" the lines to be connected. This happens even though the lens being used remains the same.

One other problem is that the radula is translucent, and one has to decide whether the tooth is being viewed dorsally or ventrally. After studying the overall perspective and relationships of teeth to each other on the radular ribbon, individual or small clusters of teeth can be detached for analysis. The overlapping of the teeth can obscure the denticles and the contour of both the entire tooth and the denticles.

The scanning electron microscope is especially useful to visualize the three-dimensional structure of radular teeth, and their functional inter-relationships. These micrographs reveal how the teeth fit against each other, and the variation in the shape and size of the main cusp depending on the angle of view. Figures 2a and 2b show the radula of Cypraea tessellata Swainson, 1822 in two SEM views. These SEM's were taken by Hugh Bradner

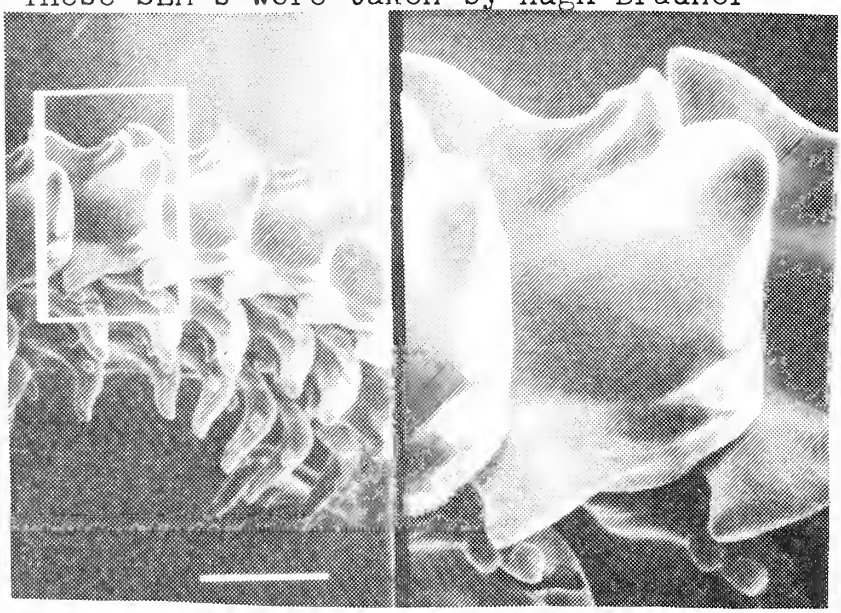


Fig. 2a. SEM of Cypraea tessellata radula. 150/450X

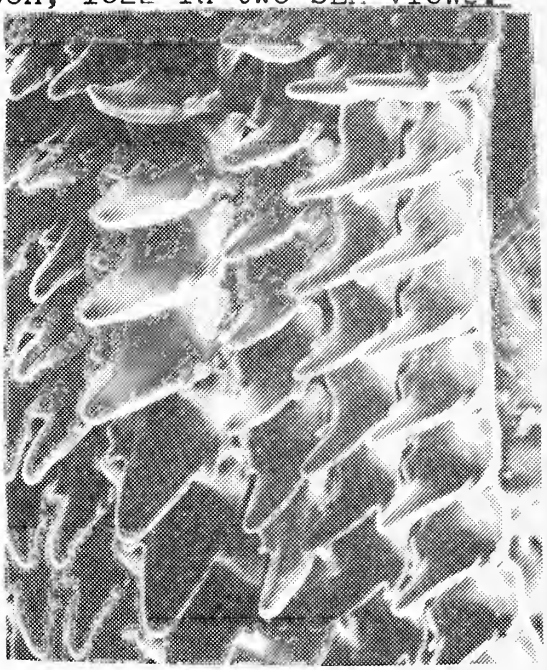


Fig. 2b. SEM of C. tessellata radula from different angle than in Fig. 2a. 100X

and reproduced here from his article, "The Sharp-Tongued Mollusks," (Festivus, Vol. XI(2): 9-15).

After we have examined the radula, we can use it for taxonomic purposes. The radula can be a very effective tool, especially in species where genus or subfamily assignment has been previously dubious because of ambivalent morphological characters in the shell. Regardless of its importance, the radula should always be considered only one character among many in descriptive taxonomy.

Following are several examples in which the study of the radula suggests a change in taxonomic placement. Austrotrophon cerrosensis (Dall, 1891) in my opinion does not belong in the Muricidae subfamily Trophoninae but in the Ocenebrinae. It is closely allied to Forreria belcheri (Hinds, 1844), in the Thaididae with which it may have congeneric affinities. Figures 3 and 4 show the radulae of Austrotrophon cerrosensis and Forreria belcheri. Both have a Forreria type radula. Small or semi-mature shells of both these species are similar and can very easily be mistaken one for the other. For contrast note the radula of a true trophonoid, Trophon geversianus (Pallas, 1777), the type of the genus, in Figure 5. The radula has the simple 5 pointed tooth characteristic of many Trophoninae species.

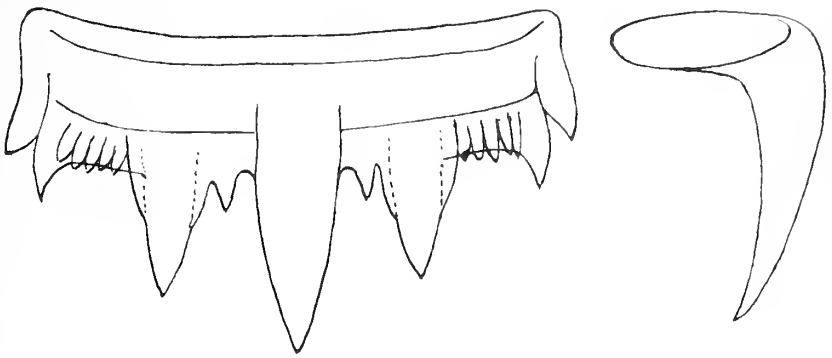


Fig. 3. Radula of A. cerrosensis

If we examine the genera Rapana from the western Pacific type species R. bezoar (Linne, 1767) and Neorapana from the eastern Pacific type species N. muricata (Broderip, 1832) we see that these genera should probably be synonymized considering the close relationship of the radulae, shell morphology, and the very few species involved. Figure 6 shows the radula of Rapana bezoar and Figure 7 illustrates the radula of the eastern Pacific species, Neorapana muricata.

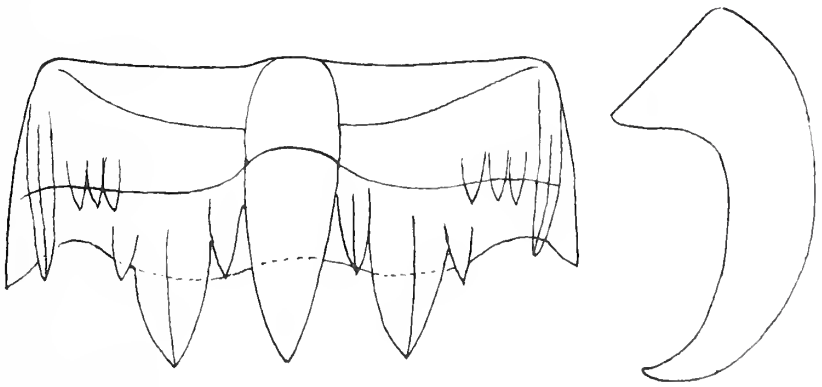


Fig. 4. Radula of F. belcheri

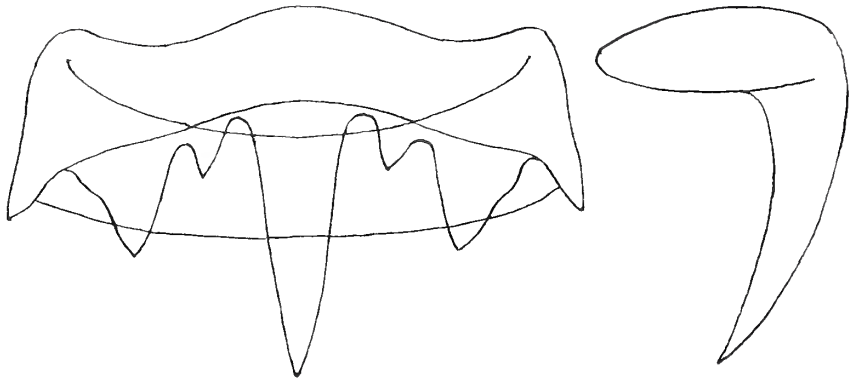


Fig. 5. Radula of Trophon geversianus

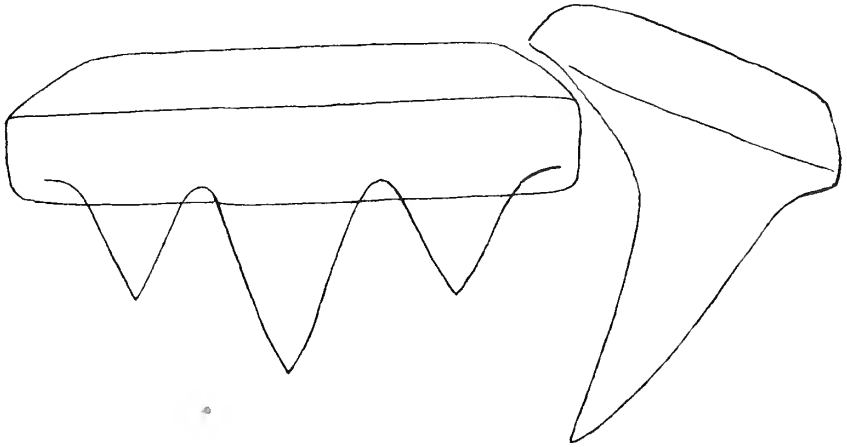


Fig. 6. Radula of Rapana bezoar (after Thiele [1929])

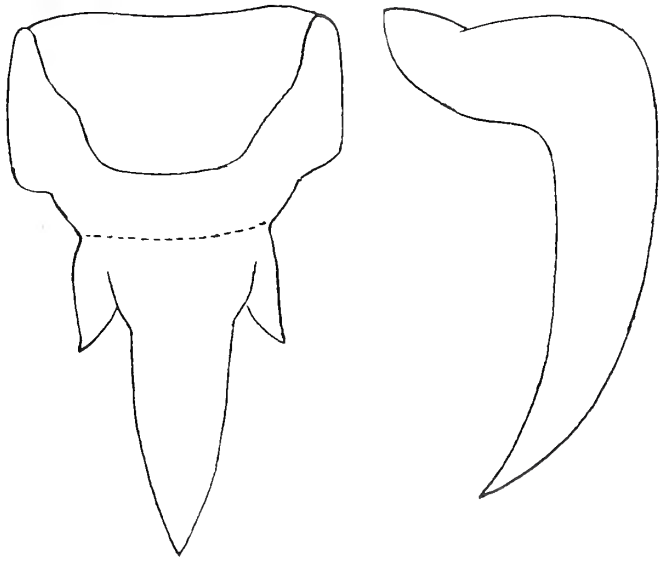


Fig. 7. Radula of Neorapana muricata

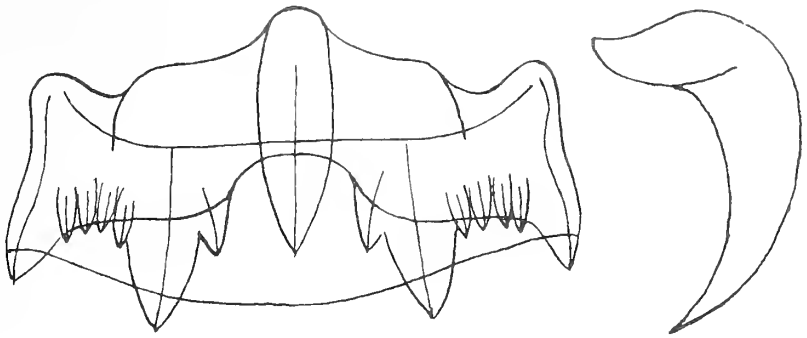


Fig. 8. Radula of Ocenebra erinaceus typical Ocenebra s.s.

The most distinguishing character of the family Muricidae is the almost consistent presence of 5 major-minor denticles, and depending on the subfamily, additionally ornamented with fine laterally placed folds extending, at times, into points (Figure 8). Ocenebra erinaceus (Linne, 1758), ranging from England to the Mediterranean, has the typical form of species in the Ocenebrinae.

Based on radular studies some genera usually included in the family may need a re-interpretation of taxonomic placement. For example, the radula of Phyllocoma scalariformis (Broderip, 1833) shows a central radular tooth with only 3 cusps (Figure 9) instead of 5. Vitularia salebrosa (King & Broderip, 1832) is another eastern Pacific species (Figure 10) but this has 7 cusps instead of 5.

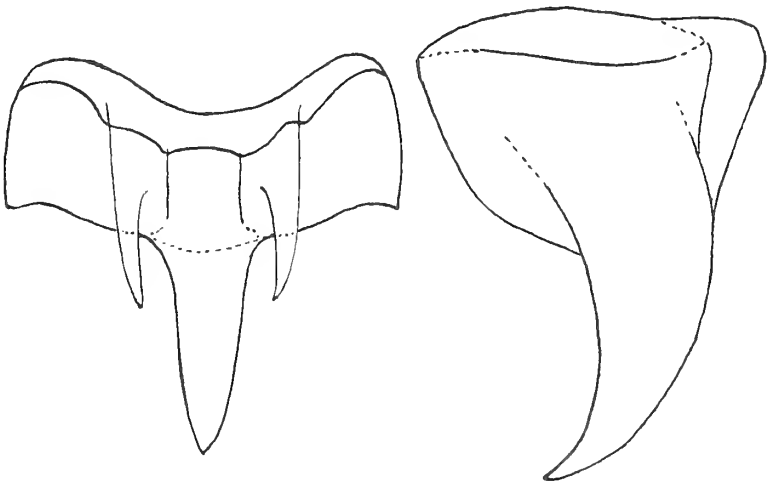


Fig. 9. Radula of Phyllocoma scalariformis

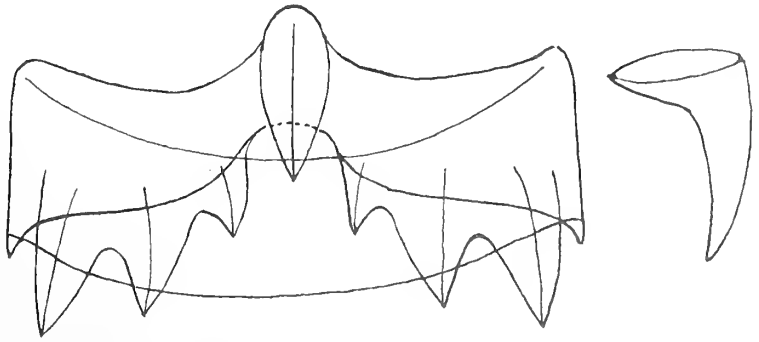


Fig. 10. Radula of Vitularia salebrosa

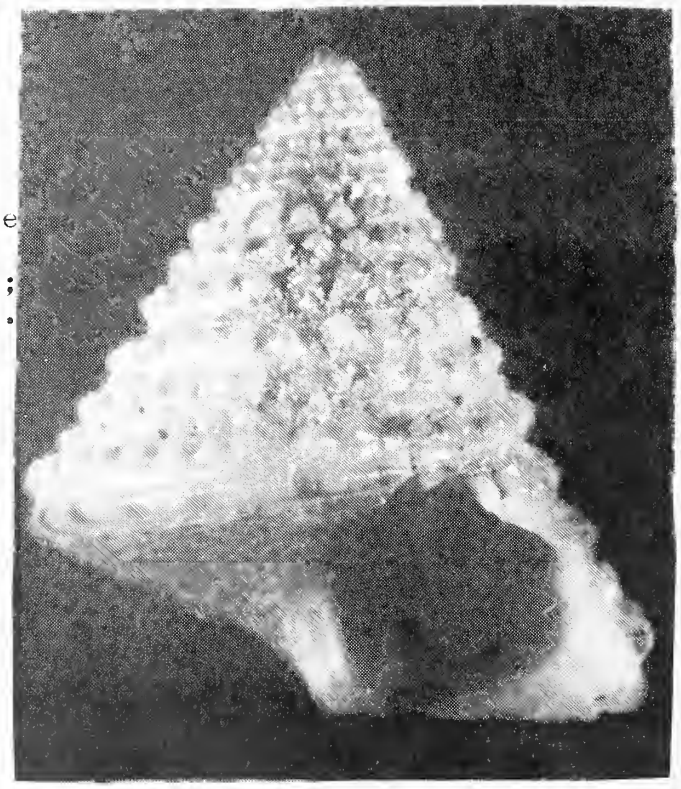
NOTES ON *CALLIOSTOMA VARIEGATUM* CARPENTER, 1864

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

A juvenile specimen of *Calliostoma variegatum* Carpenter, 1864 was recently obtained from Loyal J. Bibbey in some material trawled off the south side of the La Jolla Trench (off San Diego, Ca.). The material was trawled in nets by Ronnie Nicols in depths of 300 to 450 feet from January to June 1979. Although the specimen figured below is only 6.5 mm in diameter and approximately 7 mm in height, this species is not considered "minute" since adult specimens have been reported as large as 28 mm in height and 26 mm in width (Dall, 1902).

Although uncommon, this species' range was reported by Burch (1946) as Forrester Island, Alaska to Cerros Island, Lower California (Mexico); specimens having been dredged in depths of 20 to 80 fathoms. Individual lots have been reported in the literature from various locations off California (Avalon, Catalina Island; San Diego; San Pedro; and Monterey). It has also been reported from Puget Sound, Washington near the San Juan Islands and off Forrester Island, Alaska. Rice (1971) cites the species as being found from the intertidal to 600 foot depths.



Calliostoma variegatum
Carpenter, 1864
Magnification 12.5X

Carpenter (1864) named the species from one living specimen (6 mm in height) dredged in Puget Sound by Dr. C.B.R. Kennerley, and described it in comparison to *Calliostoma annulatum* (Lightfoot, 1786) as "small, more conical, nodules more distant, white on rosy ground." In 1865, Carpenter wrote a more detailed Latin description. Dall (1902) further described the species based on adult specimens. Palmer (1958) summarizes the synonymy of *C. variegatum* and lists the holotype as U.S. National Museum, No. "4201?"which bears the printed label, "Puget Sound, W.T. Dr. Kennerly (sic) Type." Oldroyd (1927) stated that the type was in the U.S. National Museum, no. 122567. However, Palmer (1958) pointed out that this specimen could not be the original Carpenter type since it was collected in Puget Sound in 1891 and that no. 122567 was probably the specimen figured by Dall (1902). The latter figure is that of an adult specimen, 25.0 mm in height.

Palmer described the holotype (no. 4201) as "a beautiful specimen with a tiny entire rosy protoconch consisting of one or more smooth bulbous whorls with an indistinct line of demarcation followed by a large rough whorl with spiral ribs, but the ribs are not nodose; the

nodosity begins on the following ribs. On the body whorl there is a fourth nodose interradial which on the whorls of the spire is a faint cord; the nodes are white with brownish internodes." The specimen figured here from the La Jolla Trench is approximately the same size as the holotype. It is decollate, and the teleoconch consists of five whorls. The first post-nuclear whorl has two smooth spiral cords, the next three whorls have three very nodulose cords, and the body whorl has an intercalary cord in addition to the three spiral cords. The cords are reddish brown while the nodules are translucent white. There is no consistent pattern of rows formed by the nodules in adjacent cords. Sutures between whorls are distinct and more depressed than the spaces between cords. There is a relatively smooth cord on the periphery of the body whorl. The basal area is flattened with five prominent cords containing brown spots on a translucent white background. In addition, it has a number of flatter, less prominent intercalary cords. The aperture is subquadrate.

Two lots of C. variegatum in the collection of the San Diego Natural History Museum were studied for comparison purposes. One lot, SDNHM 29441, consisting of a single shell approximately 13 mm in height and width was obtained in 50 fathoms off Santa Catalina Island, California. The second lot, SDNHM 29409, consists of 4 shells collected by George Willett off Forrester Island, Alaska. These specimens are approximately as wide as they are tall and vary in height from 13 to 20 mm. In adult shells the sutures are more distinct, the alternating brown areas are more subdued, and the basal cords are more prominent. Rice (1971) contains an excellent color photograph of an adult specimen.

The specimen figured here shows the shell as it was trawled, without cleaning. I am indebted to David K. Mulliner, Festivus staff photographer, for the excellent photograph.

Literature Cited

Burch, J.Q. Ed. 1946. Distributional list of the West American marine Mollusca from San Diego, California to the Polar Sea. [Extracts from the] Minutes of the Conchological Club of Southern California, Part II, Vols. I-II (Gastropoda), Nos. 46-63.

Carpenter, P.P. 1864. Supplementary report on the present state of our knowledge with regard to the Mollusca of the west coast of North America. Rep. Brit. Assoc. Adv. Sci. for 1863, pp. 517-686 (Aug.).

1865. Diagnoses specierum et varietatum novarum Moluscorum, prope Sinum Pugetianum a Kennerlio, nuper decesso, collectorum. Acad. Nat. Sci. Phila. Proc. Vol. 17. pp. 54-64 (April).

Dall. W.H. 1902. Illustrations and descriptions of new, unfigured, or imperfectly known shells, chiefly American, in the U.S. National Museum. Proc. U.S.N.M. Vol. 24, No. 1264, pp. 499-566, pls. 27-40.

Oldroyd, Ida S. 1927. The marine shells of the West coast of North America. Stanford Univ. Pub., Univ. Ser. Geol. Sci. Vol. II(3) 340 pp., pls. 73-108.

Palmer, Katherine E. v.W. 1958. Type specimens of marine Mollusca described by P.P. Carpenter from the west coast (San Diego to British Columbia). Geol. Soc. America Mem. 76. 376 pp., 35 pls. (Dec. 8).

Rice, Tom. 1971. Marine shells of the Pacific northwest. Ellison Industries, Inc. 102 pp., 40 pls. (June).

FROM THE MINUTES

San Diego Shell Club Meeting - 21 August 1980

CAROL BURCHARD

President Sandie Seckington called the meeting to order at 7:45 P.M. Guests were introduced and a food signup list was passed for the Shell Club party on September 13th. This event will take place at the home of Margaret and Dave Mulliner and the theme is Indian (Hindu). Kay Taylor has volunteered to give Sari wrapping lessons at Carole Hertz's on September 2nd at 7:30P.M.

Dave Mulliner was the guest lecturer for the evening and gave a very informative presentation on photographing marine animals both in the studio and underwater. Dave demonstrated with slides how the background colors, shadowing, and focusing affect the shell's appearance. He also showed many other techniques of photographing in and out of water and microphotography. Dave was good enough to bring his equipment enabling members to view the setups first hand and ask questions. (An adaptation of this talk will appear in a future Festivus. Ed.).

After the refreshment break there was a brief business meeting. A request was made to buy an electric carbon ribbon typewriter (office model) for the Club and, specifically, for The Festivus. The motion was made and passed unanimously. A discussion followed with suggestions for raising money to repay the Club treasury for this purchase.

It was announced that a $5 per meeting fee may be enacted by the city for the use of the meeting room. Roland Taylor won the door prize. The meeting was adjourned at 9:45 P.M.

NEW MEMBERS

CAIAZZA, MARY, 280 Surfview Court, Del Mar, Ca., 92014
GIBSON, DONNA, 3511 Park Blvd. Apt. #4, San Diego, Ca. 92103, 692-0084

CHANGE OF ADDRESS

NELSON, SUSAN & JOHN, 535 North 3rd St., Logan, Utah. 84321

I-5 to Garnet St. (W)
Garnet to Ingraham
Right onto Ingraham.
Ingraham to Vickie Dr.
R. on Vickie Drive
House on right side
at 5283

5283 Vickie Dr.

Vickie Drive

Foothill Blvd

Ingraham Ave

Lamont St

Soledad Mtn Rd.

Hiway 5

N
W E
S
(Only main streets shown - not to scale)

Indian theme!

nrguret o Dwe Mulliner
5283 Vickie Dr.
acific Beach
488-2701

Garnet St.

Garnet St

Balboa Ave.

Grand Ave.

Delicious food!

Come to the Party!
Saturday, September 13
6 P.M. - ?
In the Mulliners' Garden

Bring

1. Food contribution
2. Serving utensils
3. eating utensils

Liquid refreshments!

Hiway 8

Hiway 5

Food for friends!

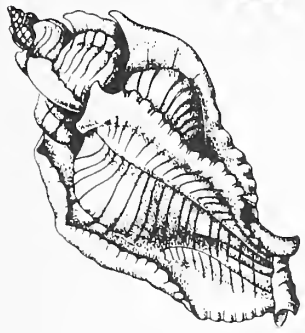
Music!

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

THIRD CLASS MAIL
RETURN POSTAGE GUARANTEED

Smithsonian Institution
Library-Acquisitions
Acct #9010520201
Washington D. C. 20560

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968
MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club, Inc.
Single membership $4.00; Family membership $5.00
Student membership $3.00; Overseas surface $6.00.
CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc.
c/o 3883 Mt. Blackburn Ave., San Diego, Calif., 92111.

Vol XII October 1980 No. 10

PROGRAM: John Duffy, marine biologist with The Department of Fish and Game, will speak on, "The Sea Life of Australia." He will accompany his talk with many of the underwater slides he took while in Australia.

Slides of the September party will also be shown.

This will be Marginella Night. Bring your Marginellas for display.

There will be a silent auction of shells to help raise funds for the typewriter for The Festivus.

Date: October 16, 1980 Time: 7:30 PM Room 104

CONTENTS

Observations on DIMYA CALIFORNIANA Berry, 1936 and redescription of the hinge (Bivalvia: Dimyacea)
MYERS, BARBARA W. and ANTHONY D'ATTILIO..... 119
Club news..... 124, 126
SIPHONIUM, an over-used name in Mollusca
KEEN, A. MYRA..... 125
Range extension for TRIGONOSTOMA ELEGANTULUM Smith, 1947
POORMAN, FORREST and LEROY POORMAN..... 127

OBSERVATIONS ON DIMYA CALIFORNIANA BERRY, 1936 AND REDESCRIPTION OF THE HINGE (BIVALVIA: DIMYACEA)

BARBARA W. MYERS and ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P. O. Box 1390, San Diego, California 92112

Superfamily: DIMYACEA Fischer, 1886, (Art. 36, ICZN - Vokes, 1979)
Family: DIMYIDAE Fischer, 1886, Man. de Conch. et Paleo. Hist. Nat. de Moll. Viv. et Fossiles Pt. 10, p. 936
Genus: DIMYA Roualt, 1850, Mem. Soc. Geol. France (ser. 2) v. 3, pt. 2, p. 470 (fide Sherborn). Dimyarina Iredale, 1936, Rec. Aust. Mus. V. 19, p. 269. Deuteromya Cossmann, 1903, Rev. Crit. Paleozool. v. 7, p. 68.

DIMYA CALIFORNIANA Berry, 1936. Proc. Malacol. Soc. London, vol. 22:126

When Dr. S. Stillman Berry named this species in 1936, it was the first record of the family Dimyidae from our California coast. In 1944, an additional species was recorded from Orange County, California: Dimya coralliotis Berry. Both species were named from single specimens. At the time he named his second species, Berry stated he had seen a number of specimens of D. californiana which had been collected on the Pacific side of Baja California and in the Gulf of California. Hertlein and Strong (1946) reported a single left valve dredged in 46 fms in Ceralbo Channel, Gulf of California. Keen (1971) gives the range for D. californiana from Southern California to Angel La Guarda Is., Gulf of California in 89 to 1227 meters.

Through the generosity of L.J. Bibbey, the San Diego Natural History Museum received a specimen which was dredged from 136 m off the La Jolla Trench, San Diego County, in June 1979 (Catalog #73605). After examination of this specimen, it is our opinion that it is D. californiana. However, we have been unable to obtain the type material for comparison.

For years there was little information regarding this small and rather obscure family. The discovery of three new species and two new genera from the Caribbean Sea and a new species from Japan in the early 1970's plus new fossil species and records from the Eocene to the Pleistocene, has given us new information about the family. It is now believed that Dimya is descended from the Upper Triassic genus Dimyodon "Munier Chalmas" Fischer, 1886.(Vokes, 1979). The genus Dimya itself was named from an Eocene fossil from France. Recent species are mostly found in deep water to 1227 m, although D. japonica Habe, 1971, was collected as shallow as 20 m. Species in the family are small, flattened and attachment is by the right valve, often to dead shells, corals etc.

The hinge which is unique within the Bivalvia was described variously as "...ligament interne, loge dans un fossette verticale" (Fischer, 1886); "Ligament linear, minute; cartilage inserted in a triangular pit in the cavity of the beak" (Dall, 1886); "Resilium resting in a strongly excavated pit in the dorsal valve, bending under a little shelf in the ventral valve" (Bartsch, 1913). Bartsch's description is accurate to some extent, but does not describe the hoop-like connection between the two valves. Precise description of the hinge of Dimya corrugata Hedley, 1902, by Yonge (1978) applies generally to the Dimyidae.

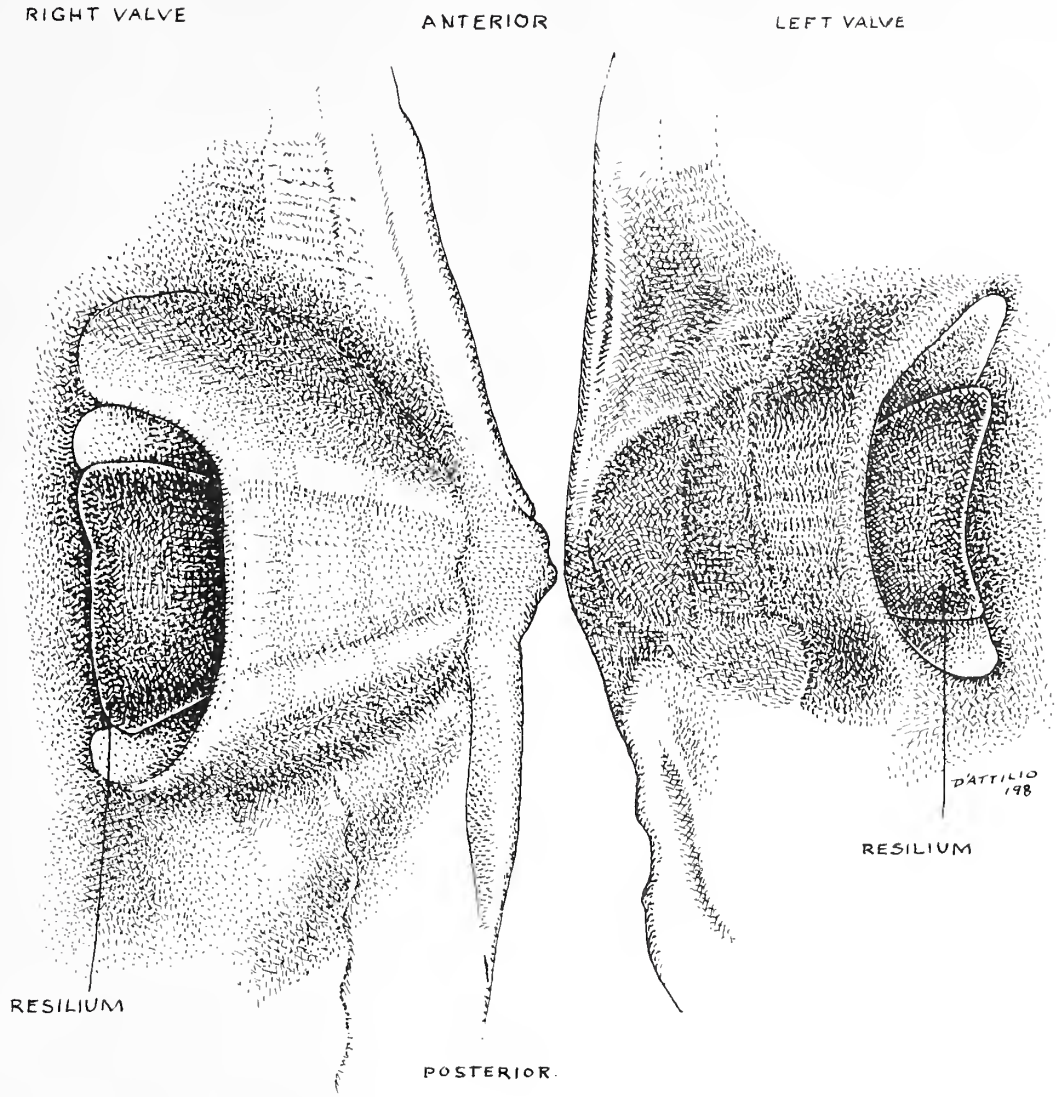


Fig. 1. Enlargement at 50X of internal ligament of D. californiana showing calcareous sockets and resilium.

In describing the hinge of D. californiana, Berry stated, "Cardinal crura slightly raised, roughened, continuous above the small rounded-triangular, pitlike socket for the resilium." His description of the hinge of D. coralliotis is similar. Our examination of the hinge of our specimen shows it is composed of a thin, linear, external, amphidetic ligament that runs longitudinally along the dorsal edge of the valves. There is an internal resilium located in a mouth-like calcareous cavity or socket in the right valve which emerges at a right angle from the umbones, makes a loop, and attaches to the left valve within a smaller cavity also at right angles (Figure 1). Yonge (1978)

has shown in D. corrugata Hedley, 1902, that the internal resilium actually forms a hoop and is connected with the external ligament (Figure 2). This resilium, as its name implies, is elastic. Under normal tension it keeps the valves gaping. When the adductor muscles contract to close the valves, the resilium is compressed; when the adductor muscles relax again the valves spring open. The left valve has a slight depression below the beak within which the larger socket of the right valve is seated when the valves are closed. Below this depression is located the smaller socket of the left valve. The socket in each valve is more or less triangular, projecting at right angles from the beaks.

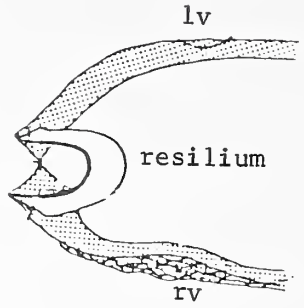


Fig. 2. Ligament of D. corrugata shown in transverse plane showing hoop. From Yonge (1978).

Figure 3 is a camera lucida drawing of the interior of the right and left valves of D. californiana showing the distinguishing characters of this species. On each side of the depression in the left valve there is a nodule. The nodule on the anterior side is longer. These nodules fit into corresponding depressions in the right valve. There are numerous unequal longitudinal wrinkles along the hinge line in both valves which mesh together when the valves are closed. The interior of the right valve has a row of minute radial ridges inside the outer edge which are stronger near the auricles and the left valve has a corresponding row of pits or depressions. These ridges and depressions seem to have no uniformity except to follow the radius of the valves. The interior of the right valve has a few microscopic radial ribs. There are two adductor muscle scars in each valve; the anterior is the smaller and is situated close to the beaks. The posterior adductor scar is bilobed. The pallial line is entire and the anterior margin is marked by a series of shallow impressions. These are easily seen in the left valve, but indistinct in the right. The shell is cemented to the substrate by the right valve; in this specimen the right valve is covered with leaf colored green paint. Exteriorly the left valve which is the upper valve has tan to white micaceous concentric lamellations. The valves are thin and flattened, but the left valve is the more inflated. The specimen measures 18 mm x 15 mm.

Keen (1971) and Cox & Hertlein (1969) both state for the family characteristics that the right valve is less convex. However, Berry (1936) in his description of D. californiana stated the right valve was "deeper" than the left valve. Dall (1886) in describing D. argentea stated the right valve is deeper and larger than the other. Habe (1971) in describing D. japonica stated that the right valve is larger and deeper. Bayer (1971) of Basiliomya goreaui states the right valve is deep whereas the left valve is flat. Moore (1971) when describing Dimyella starcki stated the right valve is cupped, the left valve flat or slightly convex. In our specimen the right valve is almost completely flat, turning up only slightly on the lower anterior edge. Because it is covered with green paint it must have been attached

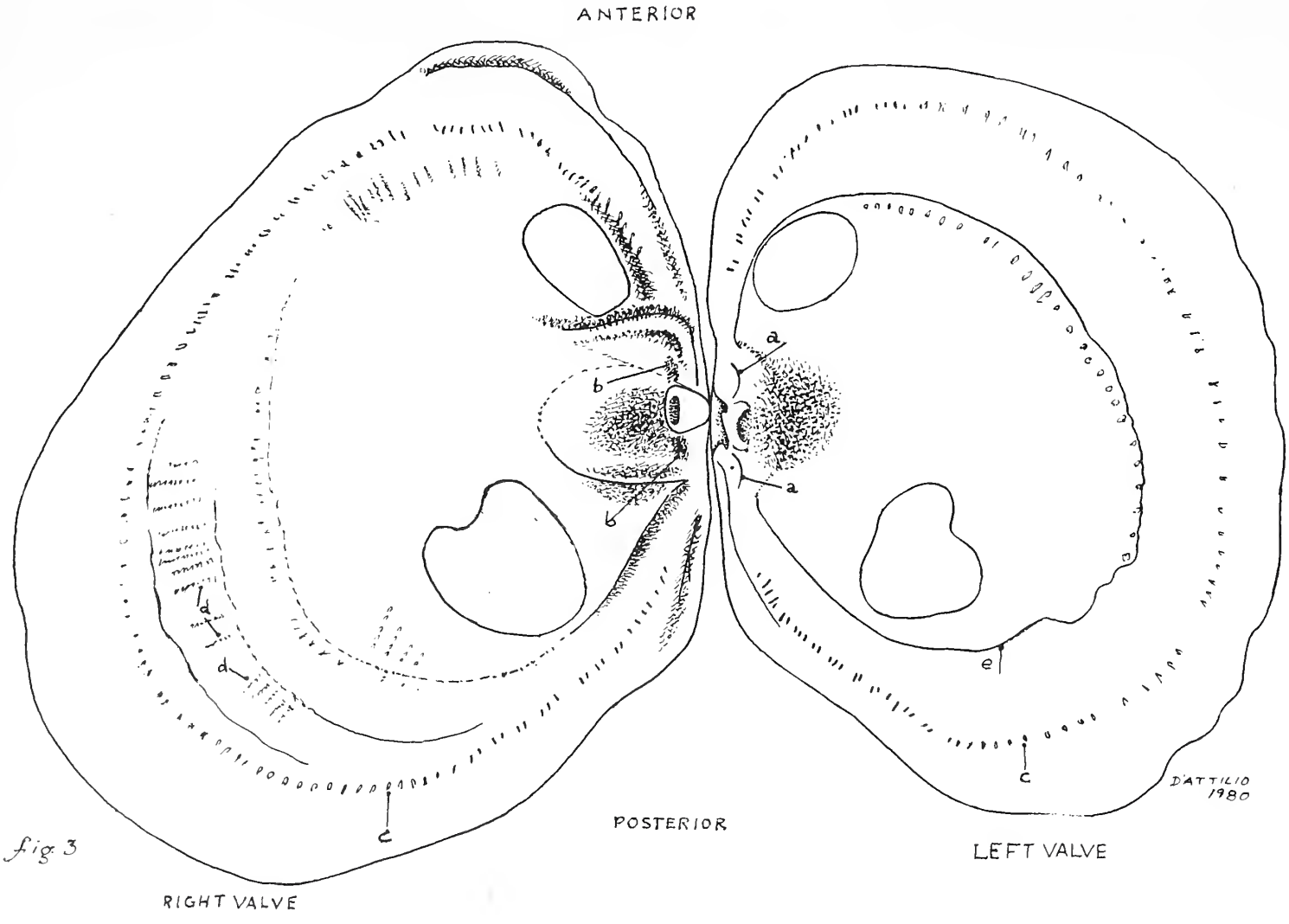


fig. 3

Fig. 3. Interior of valves of D. californiana. (a) Nodules in the left valve on each side of the socket. (b) Depressions in the right valve on each side of the socket into which the nodules fit. (c) Radial ridges in the right valve and depressions in the left valve which fit together. (d) Microscopic radial ribs in the right valve. (e) Pallial line of left valve.

to a man made flat surface. Our left valve is slightly inflated. There seems to be some confusion regarding the inflation of the valves. It may very well be that the type of substrate determines whether the right or left valve is inflated.

The Dimyidae have been previously classified in the Pectinacea by most systematists. Yonge (1978) did extensive work on the anatomy of Dimya corrugata Hedley, 1902 and Basiliomya goreaui Bayer, 1971 and found no relationship to the Pectinacea. The only other anatomical work in this family was done by Dall in 1886 when he described Dimya argentea from the Caribbean Sea. The type of the genus by monotypy, D. deshaysiana Roualt, 1850, is an Eocene fossil and therefore no anatomical work can be done on the type species. Although Yonge (1975) and (1978) seems to have found differences that set this family apart from all others in the Bivalvia, he claims it is related to the Plicatulidae, and suggests it be included in a new proposed superfamily Plicatulacea Yonge, 1975. Vokes (1979), however, comments that under the Rules of Zoological Nomenclature, the superfamily name must be the oldest name which in this case is Dimyacea Fischer, 1886. The fact that the Plicatulidae are monomyarian (they have only one adductor muscle) and the Dimyidae are dimyarian (they have two adductor muscles) plus the fact that the hinge of the Plicatulidae more nearly resembles the Spondylidae in both the inner ligament and interlocking teeth and sockets, leads us to suggest that perhaps the Plicatulidae should have their own superfamily rather than combining it with the Dimyacea. In that case the superfamily name Plicatulacea must be attributed to Watson, 1930 (Art. 36, ICZN) who first separated the genus Plicatula from the family Spondylidae on the basis of the internal anatomy, and erected the family Plicatulidae.

Acknowledgments

We are grateful to L.J. Bibbey for his generous donation of this specimen to the San Diego Natural History Museum. We wish to thank Joyce Gemmell for her assistance in identifying this specimen.

Literature Cited

Bartsch, Paul. 1913. The Philippine mollusks of the genus Dimya. Proc. U.S.N.M. vol 45(1983): 305-307. pls. 27,28.

Bayer, F.M. 1971. New and unusual mollusks collected by R/V John Elliott Pillsbury and R/V Gerda in the tropical western Atlantic. Bull. Mar. Sci. vol. 21(1): 111-236. 72 figs.

Berry, S.S. 1936. A new Dimya from California. Proc. Malac. Soc. London. 22: 126-128. pl. 13b.

1944. A second Dimya. Proc. Malac. Soc. London. 26: 25-26. 4 figs.

Cox, L.R. & L.G. Hertlein. 1969. In Treatise on Invert. Paleo., Part N. Mollusca 6. vol. 1 of 3. Ed. R.C. Moore. p. 382.

Dall, W.H. 1886. Report on the Mollusca (Blake Expeditions, 1877-1890), Part 1, Brachiopods and Pelecypods. Bull Harvard Mus. Comp. Zool. 12(6): 171-318. 9 pls.

Fischer, P.H. 1880-1887. Man. de Conchylio. et de paleo. conchyliologique. Hist. Nat. des moll. viv. et fossiles. 1369 pp. 23 pls. 1138 figs. pt. 10. 1886. p. 897-1008. Paris.

Habe, Tadashige. 1971. Dimyidae in Japan and its adjacent areas. Veliger. 13(4): 330-332. 1 pl.

Hertlein, L.G. & A.M. Strong. 1946. East Pacific exped. of N.Y. Zool. Soc. XXXIV. Mollusks from the west coast of Mexico and Central America. Pt. III. Reprint. from Zoologica, Sci. Contrib. of N.Y. Zool. Soc. 31(2): 53-76. 1 pl.

International Code of Zoological Nomenclature. 1961. N.R. Stoll Chairman Editorial Committee. 176 pp. London.

Keen, A.M. 1971. Sea shells of tropical west America. 2nd. ed. Stanford Univ. Press. 1064 pp.

Moore, D.R. 1970. A new genus and species of Dimyidae from the Caribbean coast of Mexico. Jour. de Conchyl. 107(4): 137-141. 1 pl.

Vokes, H.E. 1979. Observations on the genus Dimya (Moll. Bivalvia) in the Cenozoic faunas of the western Atlantic region. Tulane Studies in Geol. and Paleo. 15(2): 33-53. 4 pls.

Watson, Hugh. 1930. On the anatomy and affinities of Plicatula. Proc. Malac. Soc. London. vol. 19: 25-30. pl. 5.

Yonge, C.M. 1975. The status of the Plicatulidae and Dimyidae in relation to the superfamily Pectinacea (Moll. Bivalvia). Jour. Zool. 176(4): 545-553. 4 figs.

1978. On the Dimyidae (Mcll. Bivalvia) with special reference to Dimya corrugata Hedley and Basiliomya goreaui Bayer. Jour. of Moll. Studies. 44(3): 357-375. 17 figs.

THE SAN DIEGO SHELL CLUB'S ANNUAL SEPTEMBER PARTY

CAROL BURCHARD

The Club party was held on September 13th at the home of Margaret and Dave Mulliner. The theme was East Indian, and during the cocktail hour as Indian music played, members had the opportunity to admire the beautiful saris worn by some of the guests. Marty Schuler arrived as a snake tamer--python and all!

Dinner consisted of a gourmet buffet of Indian curries, chutneys and traditional side dishes. The expertise of June King was much appreciated both in her formulation of the menu and explanation of how, and in what order, a typical meal is served. An array of delicious desserts followed, which was enjoyed by all in the Mulliners' lovely garden. Many thanks to Peg and Dave for their hospitality, and to all who made the party and buffet so entertaining and delicious.

CHANGE OF ADDRESS

Richard Herrmann, c/o U.N.E.X.O., Box F-2433, Freeport, Grand Bahama Island

SIPHONIUM, AN OVER-USED NAME IN MOLLUSCA

A. MYRA KEEN*

2241 Hanover Street, Palo Alto, California 94306

For the better part of a century, the name Siphonium was used in the gastropod family Vermetidae without much inquiry into its history, although O.A.L. Mörch had discussed it briefly in 1859. Mörch, who was the principal reviser of the family during the last century, used the name for the group we now call Dendropoma. In 1847 J.E. Gray had cited Siphonium as a synonym of Vermetus, but in 1850 he adopted it as a genus for several Indo-Pacific species. Actually, Gray had picked up the generic name from a Patrick Browne who, in 1756, had published a work entitled, "Civil and Natural History of Jamaica." Browne's book came out two years before the 1758 edition of "Systema Naturae" by Linnaeus, the work that now is taken as the starting point of zoological nomenclature. Browne's publication is, therefore, to be rejected as a source of names, being pre-Linnaean.

Mörch utilized the name Siphonium, although he was aware that it had been proposed in another connection prior to Gray's re-introduction of Browne's name. A German paleontologist, Link, had named in 1807 a new genus in Cephalopoda that he called Siphonium. According to Mörch, in his 1859 review of names, Link's description was "bad," and Mörch felt that such a faulty usage should be ignored. Following his lead, authors did ignore it until well on into the present century, but gradually it was realized that Link's generic name technically must be accepted as available.

I became curious to know what it was that Link had had that he named Siphonium, and I looked up his work. His description was brief, but he did cite a type species, a fossil cephalopod of a group having an almost straight, tubular shell. To my surprise, I found that the name had been completely overlooked in the cephalopod volumes of the "Treatise on Invertebrate Paleontology." One must admit that cephalopod specialists will have problems deciphering Link's type species, for his type material in the museum of the University of Rostock now is virtually unrecognizable because of mixing and inadequate labelling. This Siphonium may therefore have to be set aside as a genus dubium. However, it still preoccupies the use of Siphonium in Vermetidae.

Next, I began to wonder whether Siphonium might have been used even earlier than 1807 for a genus in some other zoological phylum. Surprisingly, I found that Charles Sherborn, in his monumental compilation of zoological names, "Index Animalium," had listed, in the volume on names proposed before 1800, Siphonium as available in 1789 from a second edition of Browne's work. It is true that reissue of a pre-Linnaean work after 1758 would make it an available source of names, provided it was substantially binomial in format. However, Browne's work was not. Perhaps the reason Sherborn had been persuaded to accept Siphonium in this context was that in discussion of one of his five unnamed species, Browne mentioned that the tube was the work of Teredo navalis. This is a legitimate Linnaean name for the type species of the pelecypod group Teredo, and one might argue that Browne's citation of it would fix by monotypy

* This paper was presented by Dr. Keen at the 1980 meeting of The Western Society of Malacologists (W.S.M.).

the type species of Siphonium. Were this the case, Siphonium would be revived only to fall as a synonym of Teredo Linnaeus, 1758. This would give the name Siphonium the distinction of having been proposed for use in three different molluscan classes: Gastropoda, Cephalopoda, and Pelecypoda (Bivalvia). I do not think we can accept Browne's 1789 usage as available, because the work as a whole does not meet the requirements of the ICZN Code.

I also consulted some other zoological nomenclators to see whether they were in agreement with Sherborn. One large European work was not. It cited Siphonium as dating from Gronovius, 1781. Dr. Robert Robertson of the Philadelphia Academy of Sciences kindly looked this up in their library (as he had also the Browne, 1789, work). He found that Gronovius cited the name only in synonymy of Xylophagus and Serpula. Therefore, I conclude that Link's 1807 usage probably is the first valid one.

My general conclusion is that the name Siphonium should be allowed to slide into obscurity. It could be revived for use in Vermetidae only by petitioning the International Commission to suppress Link's unrecognizable taxon. I am in no mood to do that at the present time.

FOR YOUR INFORMATION

1) The Club's Annual Christmas Party will be held on December 13, 1980 in the La Sala Room of the Cafe Del Rey Moro in Balboa Park. Mark your calendar. Details in the November issue.

2) The Club library has been enriched by exchanges of publications with other societies and museums. The most recent exchanges are with the Israel Malacological Society (publications Argamon and Levantina) and the New Zealand Oceanographic Institute (NZOI). These publications and others received in exchange are available for circulation in the Club library. Make use of the wealth of material in your library.

3) Please notify the Club when you change your address. The mailing costs triple when issues are returned. Club address is on the front page.

4) THE FESTIVUS NEEDS YOUR ARTICLES!

RANGE EXTENSION FOR TRIGONOSTOMA ELEGANTULUM SMITH, 1947

FORREST & LEROY POORMAN
15300 Magnolia, Westminister, California 92683

Trigonostoma elegantulum, a beautiful small species, was described from a specimen collected at Panama Bay. In 1972 Ann Marti of the Canal Zone visited us and left a nice specimen as a memento. In January 1974 after our retirement, we visited Manzanillo, Colima, Mexico and dredged a dead collected specimen in Santiago Bay. Carl and Laura Shy also took a number of specimens there from 1960-1972. The northernmost record for the species was from Coastecomate, Jalisco (Keen, 1971).

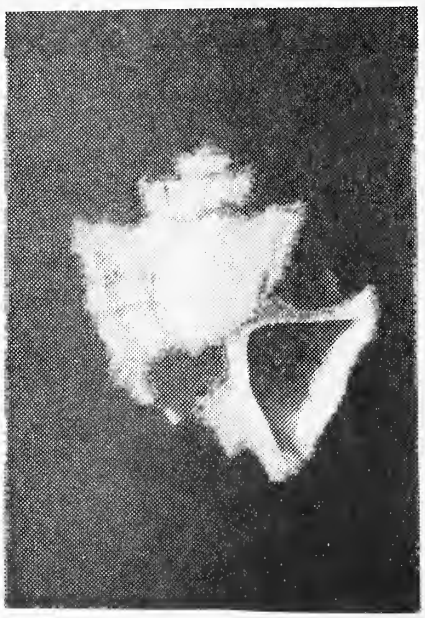
During 1975-76, the Shys and the Poormans dredged 3 specimens (2 alive) in 5-10 meters on coarse gravel west of Bahia San Carlos, Sonora, Mexico. This extends the recorded range for the species some 1175 kms northward along the coast of Mexico, 8°Lat. north of Coastecomate.

Genus: Trigonostoma Blainville, 1827
Subgenus: Ventrillia Jousseaume, 1887

Shell tightly coiled; spire whorls overnanging or sloping outward at the suture; umbilicus well developed.

Trigonostoma elegantulum Smith, 1947

Shell small, about as wide as high; 3 whorls, with in addition a minute darker colored nucleus of about 1 whorl; surface descending within to the suture; 7 varices upon the final whorl, their terminations forming pointed processes upon the peripheral keel, the interspaces undulating; secondary keel rounded, slope between the two keels concave; umbilicus open, wide, funnel shaped; aperture trigonal; lip widely expanded, a single denticle upon the parietal wall.
Alt. 10.5mm, Max. diam. 11. 5 mm.
Type locality; Pearl Islands, Panama (Clark)

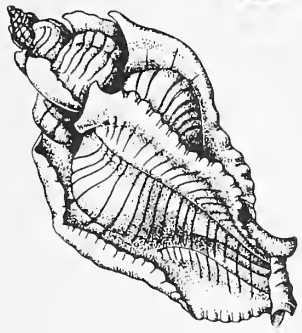


T. elegantulum Smith, 194
Magnification: 4X

Literature cited

Keen, A. Myra. 1971. Sea shells of tropical West America marine mollusks from Baja California to Peru. 2nd Ed. Stanford Univ. Press. i-xiv, 1064 pp., ca. 4000 text figs., 22 pls. (21 Sept.).
Smith, Maxwell. 1947. A Recent Perplicaria and other new Panamic marine shells. Nautilus. 61: 53-56. pl. 2. (18 Dec.).

THE FESTIVUS



SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

MEETS THIRD THURSDAY, 7:30 P.M.
ROOM 104, CASA DEL PRADO, BALBOA PARK

ANNUAL DUES: Payable to San Diego Shell Club Inc. Single membership: $4.00; Family membership: $5.00; Student membership: $3.00; Overseas surface: $6.00.

CLUB ADDRESS: Address all correspondence to San Diego Shell Club, Inc. c/o 3883 Mt. Blackburn Ave., San Diego, California 92111

VOL. XII NOVEMBER 1980 NO. 11

PROGRAM: John Duffy, marine biologist with the Department of Fish and Game will speak on, "The Sea Life of Australia." He will accompany his talk with many underwater slides. (Mr. Duffy was unable to be our speaker in October and will give his program this month).

Slides of the September party will also be shown.

DATE: November 20, 1980 TIME: 7:30 P.M. ROOM 104

CONTENTS

Deception in shell appearance
D'ATTILIO, ANTHONY..... 129
Photographing sea shells
MULLINER, DAVID K..... 133
Modiolus capax (Conrad, 1837)
HERTZ, JULES..... 135
Club news..... 136
A selected index to volume XII (1980)..... 137

THE FESTIVUS DOES NOT PUBLISH A DECEMBER ISSUE.

DECEPTION IN SHELL APPEARANCE

BY

ANTHONY D'ATTILIO

Department of Marine Invertebrates, Natural History Museum, Balboa Park
P.O. Box 1390, San Diego, California 92112

In the first half of the 19th Century a number of gastropod species that appeared superficially similar were placed in the genus *Ranella* Lamarck, 1816. The distinguishing character of these species was the presence of two varices usually occurring on the body whorl but frequently found on the spire as well. Since the two varices are on opposite sides of the shell, the general appearance is flattened in a dorso-ventral position.

The genus *Ranella* was described by Lamarck in 1816 and a number of species were assigned to it by him. These shells were commonly referred to as "frog shells." *Rana* is a genus name used for some species of frogs. Hence, *Ranella* meaning little frogs or frog-like because of their fancied resemblance to frogs and toads which have nodes, bumps and warty growth characters like the shells.

Both *Ranella* and the related "Triton shells" were later made into two families, Bursidae and Cymatiidae, each of which now contains a number of genera.

Ranella pulchra Lamarck, 1816, commonly called "the maple leaf shell" is a striking example of a species having only two varices on opposite sides of the entire shell. It now bears the scientific name *Gyrineum (Biplex) perca* (Perry, 1811) and is placed in the family Cymatiidae (figure 1). Mesogastropod families such as Bursidae and Cymatiidae have a radula bearing five teeth in each row, a central (rachidian) tooth and two laterals on either side. Figure 2 shows a generalized cymatiid radula.

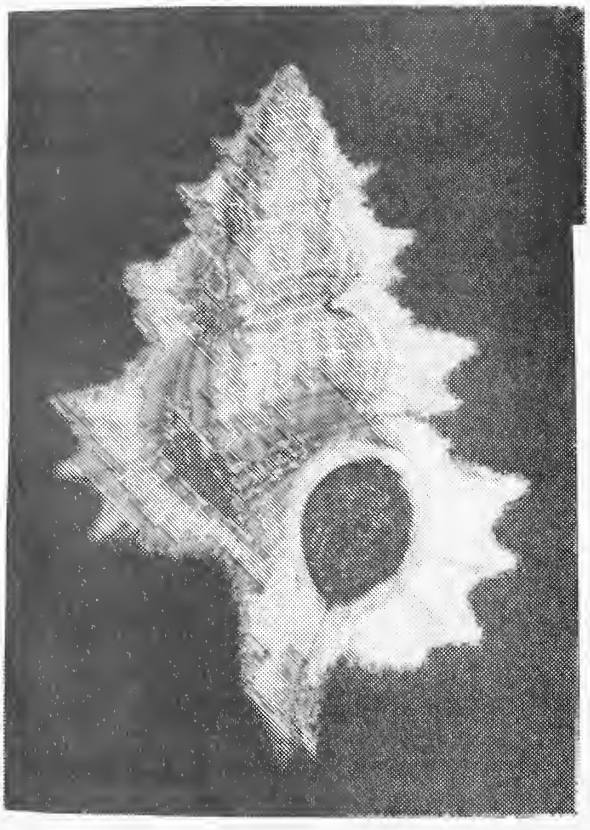


Fig. 1 *Gyrineum (Biplex) perca* (Perry, 1811)

Fig. 2 Generalized cymatiid radula

Other species placed by Lamarck in his all inclusive genus *Ranella* by reason of their dorso-ventral flattening have since been proven to belong elsewhere in the gastropoda. Many of these species are in the superfamily Muricacea. Historically, these determinations became possible only when the importance of the radula was realized. With the radulae as guide, the assignment to family and genus became more reliable. The radula in the Muricacea is reduced to three teeth for each row. The rachidian or central tooth possesses the variability of structure which determines the subfamily and generic placement. The pair of laterals are simple hook-like teeth. Three muricids which show dorso-ventral flattening are discussed below.

Family: Muricidae
Subfamily: Muricinae
Genus: *Aspella*

Aspella pyramidalis (Broderip, 1833), a typical species of *Aspella s.s.*, has dorso-ventral flattening with two laterally placed varices on the body whorl as shown in Figure 3. Some *Aspella* species have as many as six varices on the upper spire which may diminish to four on the penultimate whorl and two on the body whorl. Regardless of how many varices are present on the spire, the body whorl tends to have two main varices sometimes with very weak secondary ones which do not affect the dorso-ventral flattening. The radula of *A. pyramidalis* is illustrated in Figure 4.

Fig. 3 *Aspella pyramidalis* (Broderip, 1833)

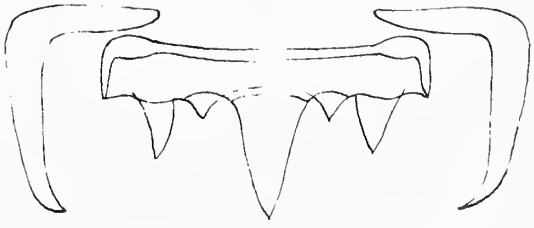


Fig. 4 Radula of *A. pyramidalis*

Family: Muricidae
Subfamily: Ocenebrinae
Genus: *Eupleura*

Eupleura nitida (Broderip, 1833) has laterally paired varices on the entire

shell as shown in Figure 5. In this respect it differs from other *Eupleura* species in which the flattening occurs only on the body whorl with two varices. The spire may be rounder and have more than two varices. The radula of *E. nitida* is illustrated in Figure 6.

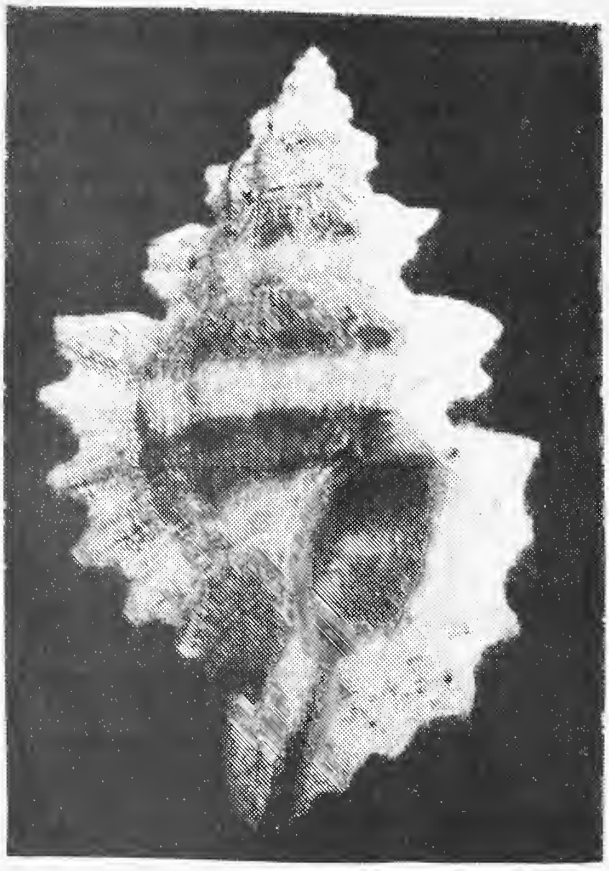


Fig. 5 *Eupleura nitida* (Broderip, 1833)

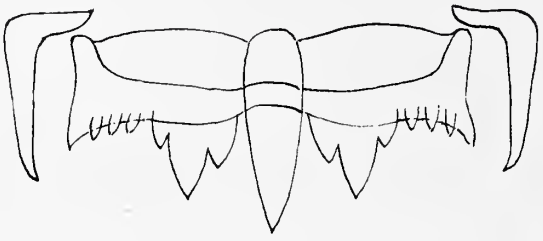


Fig. 6 Radula of *E. nitida*

Family: ? Muricidae
Genus: *Phyllocoma*

Phyllocoma scalariformis (Broderip, 1833) is shown in Figure 7. This genus with a very few species is placed among the *Murex* with some question although this assignment is followed in most malacological works. More than two varices are found on the spire but the body whorl retains only two. The radula of *P. scalariformis* is illustrated in Figure 8.

As though to complicate matters, since there must be exceptions to all rules, occasional genera in completely unrelated families are found with a muricid-like radula having a rachidian with two hook-like laterals. These genera are *Pusio* in the Mitridae, *Metzgeria* in the family Vasidae, and *Zemira* in the family Olividae.

It may then be concluded that the radula and shell characteristics are very important complementary tools in the classification of gastropod mollusks and neither by itself is sufficiently reliable an index to systematic position.

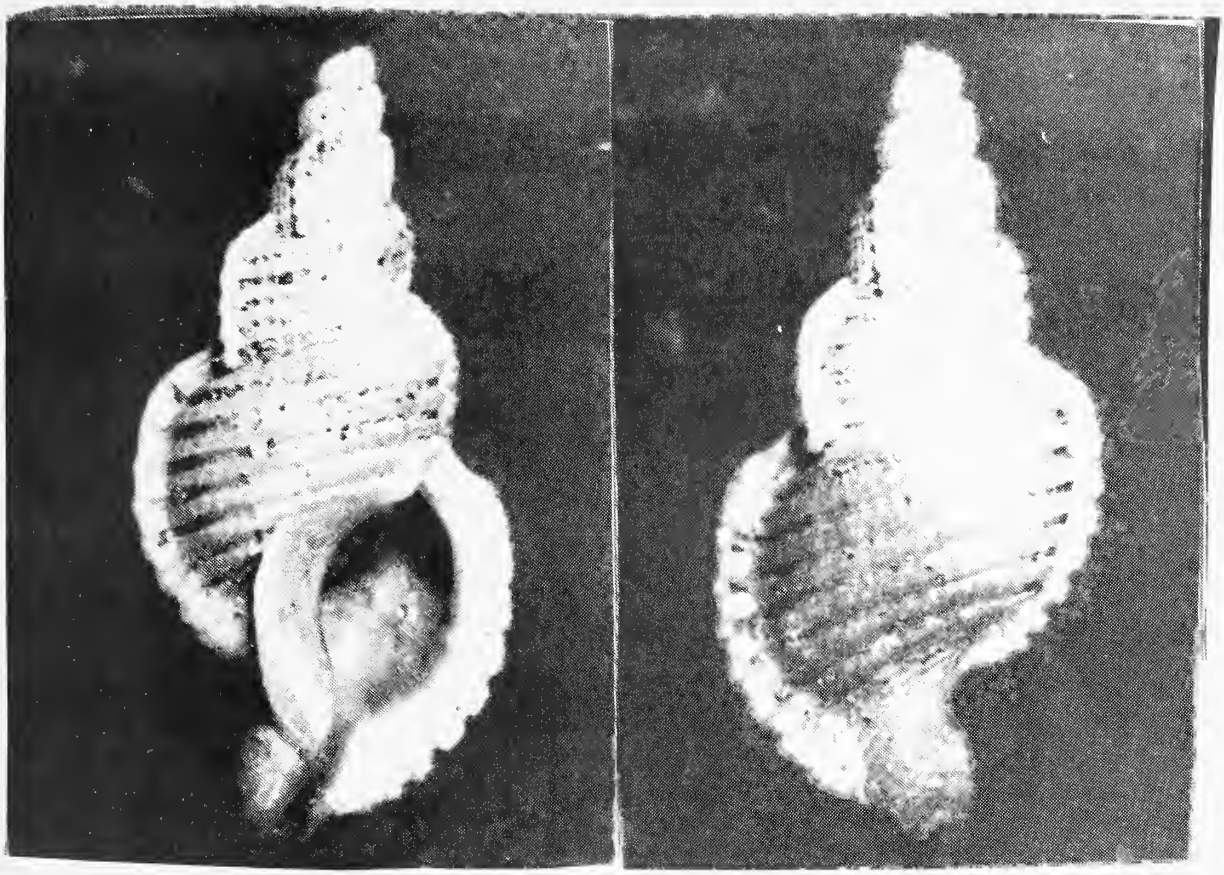


Fig. 7 Ventral and dorsal views of *Phyllocoma scalariformis* (Broderip, 1833)

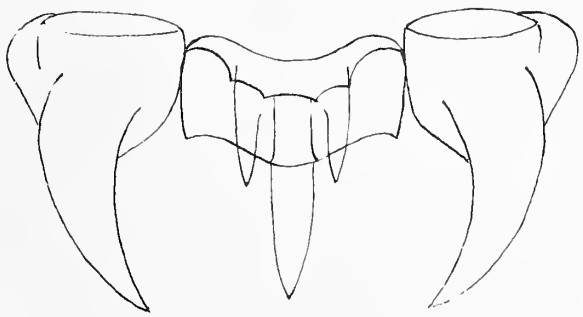


Fig. 8 Radula of *P. scalariformis*

Acknowledgments

Photographs were taken by Barbara W. Myers, the radula drawings were made by me from specimens mounted by the late George E. Radwin. Jules Hertz critically read the paper.

PHOTOGRAPHING SEA SHELLS

BY

DAVID K. MULLINER

Department of Marine Invertebrates, Natural History Museum, Balboa Park,
P.O. Box 1390, San Diego, California 92112

Photography is a universal hobby. Just about everyone takes pictures. The difference between photographing your family and taking photos of sea shells is merely a matter of technical knowledge and practice. Just about any camera can be used but a reflex (through the lens viewing and focusing) camera is easier to handle.

A reflex camera mounted on a sturdy support such as a copy stand frees your hands for manipulation of the sea shells (Figure 1). A bulb type shutter release can be placed on the floor to be triggered by your foot. The lens is mounted on a bellows for close focusing. As an alternative a macro lens can be used for this purpose. The lighting should be electronic flash if you use daylight color film or electric lights if you use indoor (tungsten) film.

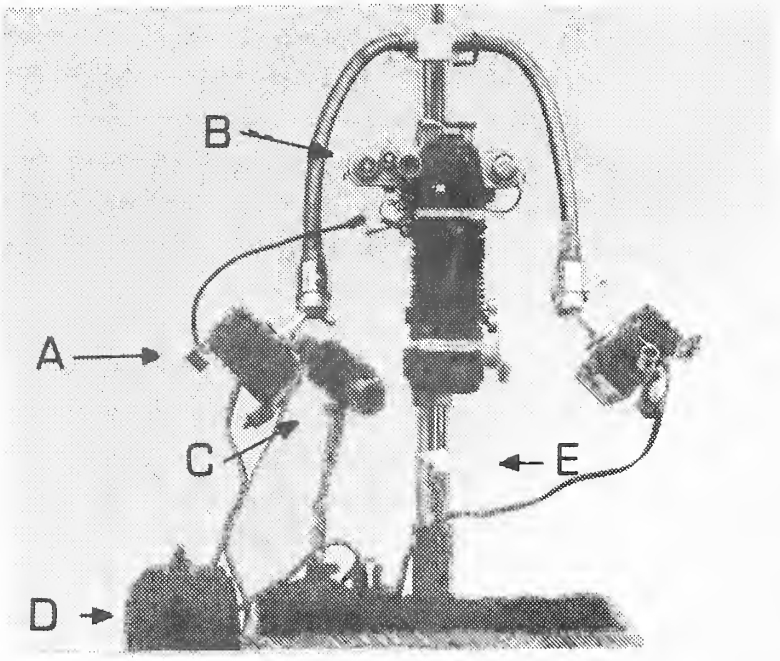


Fig. 1 Equipment mounted on copy stand--setup for photographing shells or live animals. (For live animals substitute a photographic aquarium for the pedestal. A) strobe lights on gooseneck extension arms. B) camera mounted on bellows. C) focusing light. D) power supply for focusing light. E) shell positioned on a pedestal above the background.

Backgrounds are important and should be chosen carefully. Colored backgrounds of either velvet or paper should be placed far enough back of the subject to be out of focus. It is sometimes necessary to illuminate the background with lights to produce a three dimensional effect: light blue or gray will give the greatest three dimensional effect while black will give the least.

Natural backgrounds are very effective especially with live animals. If a wet background is used, i.e. seaweeds, it will be necessary to submerge it in water to eliminate light hot spots in the picture. Natural backgrounds slightly out of focus

will produce a greater three dimensional effect than those in focus. Choose your background to create a natural effect for the animal being photographed. Cluttered and busy backgrounds should be avoided.

Lighting of the subject is probably the most important technique in photography. The sculpture of the shell can be enhanced by placing the light at an angle perpendicular to the lines of the sculpture. This produces shadows in the depths of the whorls thus giving a three dimensional effect. Two lights at slightly different distances on opposite sides of the subject will lighten the shadows and light all the features (Figure 2). On live animals a single light on one side with a reflector on the other produces full detail and high contrast to enhance colors. An excellent reflector is well crumpled aluminum foil that has been flattened out or shaped to reflect the light on the subject.

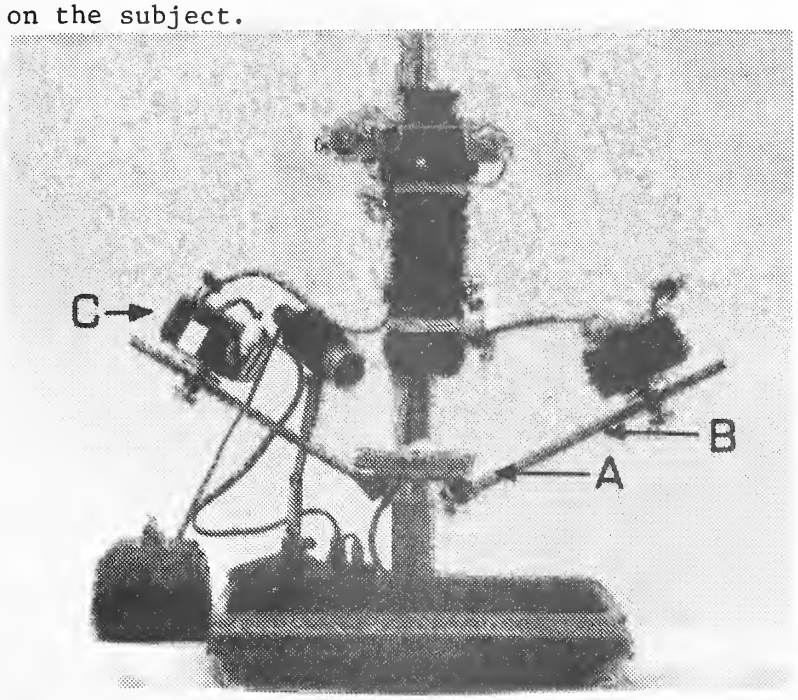


Fig. 2 Equipment mounted on copy stand--setup for photographing miniature shells. A) microscope stage. B) light bars mounted at angles on microscope stage to maintain proper lighting. C) strobe lights.

Live animals can be photographed in an aquarium either through the glass or straight down through the water. Lights should always be at an angle to eliminate reflections from the surface. If a shell animal is reluctant to come out of its shell, turn it over on its back. Usually it will come right out and turn itself over again.

To compose the picture well, fill the picture with the subject. Move in close. Develop infinite patience and enjoy photographing your prize specimens.

NEW MEMBER

Bo Prince, 10254 Rio Camino, Lakeside, California 92040

CHANGES OF ADDRESS

Hans Bertsch, P.O. Box 2041, Spring VAlley, California 92077
Edwin Roworth, 1361 Windsor Road, Cardiff, California 92007

MODIOLUS CAPAX (CONRAD, 1837)

BY

JULES HERTZ

Department of Marine Invertebrates, Natural History Museum, Balboa Park, P.O. Box 1390, San Diego, California

On 12 October 1980, I collected a single specimen of *Modiolus capax* (Conrad, 1837) in beach drift at Libbey Beach Park, Whidbey Island, Washington. The shell was 83 mm in length and had both valves attached. The periostracum was intact and shiny (complete with hairs on the posterior end), the hinge was complete and in good condition, and the inside of the shell was glossy without any signs of algae formation. All indications were that the shell had recently housed the living animal. The posterior end of the valves were chipped. Many bivalves in the area had similar breaks as if they had been damaged by gulls.

The shell was identified by comparison with figures in McLean (1978) of *Modiolus capax* (Conrad, 1837) and *Modiolus rectus* (Conrad, 1837). The range listed by McLean for *M. capax* is Santa Cruz, California to Peru and for *M. rectus* as Vancouver Island, British Columbia to the Gulf of California. The range for *M. capax* reported by Abbott (1974), Keen (1971), and Olsson (1961) agrees in general with that listed by McLean.

The finding of a single specimen of *M. capax* on Whidbey Island may just be a freak occurrence. However, collectors should keep alert for additional specimens from this general locale which would, if found, indicate a significant range extension.

Literature Cited

Abbott, R. Tucker. 1974. American seashells 2nd edition. Van Nostrand Reinhold. 663 pp. 6405 text figs.

Keen, A. Myra. 1971. Sea shells of tropical West America marine mollusks from Baja California to Peru. 2nd edition. Stanford Univ. Press. 1064 pp., 4000 text figs., 22 pls. (Sept. 21).

McLean, James H. 1978. Marine shells of Southern California. LACM (NH) Sci. Ser. 24. Revised ed. Zoology (11). 104 pp., 54 figs. (Mar. 20).

Olsson, Axel A. 1961. Mollusks of the tropical eastern Pacific, particularly from the southern half of the Panamic-Pacific faunal province (Panama to Peru), Panamic-Pacific Pelecypoda. Paleo. Res. Inst. Ithaca, N.Y. 574 pp., 86 pls. (Mar. 10).

THE FESTIVUS PUBLISHES NO DECEMBER ISSUE.

FROM THE MINUTES

SAN DIEGO SHELL CLUB MEETING: OCTOBER 16, 1980

BY

CAROL BURCHARD

Vice President David Mulliner called the meeting to order at 7:55 P.M. and introduced speaker Ron McPeak, senior marine biologist at Kelco, who gave a most informative and enjoyable slide presentation on the marine life in Baja California. Ron compared the life on the west coast of Baja to that on the Gulf side. He showed many beautiful underwater slides, some of the giant kelp, *Macrocystis* which provides food and protection for many forms of marine life.

After the refreshment break the executive board presented its slate of nominees for office for 1981. They are as follows: President, Carol Burchard; Vice President, Ron McPeak; Corresponding Secretary, Marjorie Bradner; Recording Secretary, Martin Schuler; and Treasurer, Walter Robertson. It was announced that David Mulliner has agreed to be Technical Advisor for 1981. Additional nominations will be accepted at the November meeting prior to the election of officers.

The Club's annual Christmas dinner party will be held on December 13th at the La Sala Room of the Cafe Del Rey Moro in Balboa Park. (See details in this issue. Ed.).

The Club has purchased an IBM Correcting Selectric typewriter for The Festivus at a cost of $800. Sale of duplicate library material has already raised $500. toward the purchase cost. Silent auctions of shells are also being held and the idea of printing Club T-shirts was presented to the members as another way to help pay for the typewriter.

The Western Society of Malacologists (WSM) will hold its convention at San Diego State University June 23rd through June 26th 1981 and the Club will be the host for this event.

Heidrun Faulconer was the winner of the shell door prize.

The meeting was adjourned at 9:20 P.M.

THE GALA ANNUAL CLUB CHRISTMAS PARTY

The Club's annual Christmas dinner party will be held on Saturday, December 13 in the La Sala Room of the Cafe Del Rey Moro in Balboa Park. The festivities will begin at 6:00 P.M. with a no host cocktail hour. Dinner will be at 7:15 P.M.

MENU: Tossed salad, hot rolls and butter
Chicken Cordon Bleu and rice pilaf
Chocolate mousse, choice of coffee or tea
Complimentary dinner wine will be provided by the Club.

Dinner is $9.00 ($7.65 plus tax and gratuity). Reservations should be in by December 5. Make checks payable to San Diego Shell Club, Inc. and give it to the treasurer at the November meeting or send it to the Club address (front page).

Following dinner, the Madison High Honor Ensemble under the direction of Gilbert Sloan will again warm our spirits with a Christmas choral program. As is traditional we will again have a shell gift exchange. Bring your gift wrapped shell to place under the tree. Place data and name inside the package only. On the outside just list the general locale i.e. Indo-Pacific, Gulf, etc. Numbers are drawn and those who bring a shell gift choose one from under the tree.

Come to the party. The nicest people will be there!! Guests welcome.

A SELECTED INDEX TO VOLUME XII (1980)

Listings are by both author and title. The first number refers to the month; the numbers after the colon to the pages. Brackets are used for explanation.

BERTSCH, HANS & SCOTT JOHNSON
Preliminary analysis of the geographic and bathymetric distribution of Hawaiian chromodorids (Gastropoda: Opisthobranchia). 6:73-77.

D'ATTILIO, ANTHONY
Trophon painei (Dall, 1903): an anomalous *Murex* (Gastropoda, Muricidae, Trophoninae).1:6-9.

Actinotrophon actinophorus (Dall, 1889).4:61-62.

A supplementary note on *Favartia dorothyae* Emerson & D'Attilio, 1979. 5:67-68.

Muricopsis jaliscoensis Radwin & D'Attilio, 1970 at Panama. 6:78-79.

A note on *Paziella hystricina* (Dall, 1889). 8:95-96.

Notes on gastropod radulae. 9:110-114.

Deception in shell appearance. 11:129-132.

D'ATTILIO ANTHONY & HANS BERTSCH
Comments on species of *Homalocantha* (Gastropoda: Muricidae). 2:14-20.

GEMMELL, JOYCE, CAROLE M. HERTZ & BARBARA W. MYERS
Seastar predation on mollusks in the San Felipe Bay area, Baja California, Mexico. 3:23-55.

HERTZ, CAROLE M.
Editor's note [A collation for Keen (1971)]. 4:63.

Notes on *Turritella leucostoma* Valenciennes, 1832. 9:103-109.

HERTZ, JULES
Minute shells *Amphissa undata* (Carpenter, 1864). 5:66.

Minute shells *Daphnella clathrata* Gabb, 1865. 8:97-100.

Minute shells *Homalopoma grippii* (Dall, 1911). 1:2-5.

Modiolus capax (Conrad, 1837). 11:135.

Nassarius insculptus (Carpenter, 1864). 4:58-60.

Notes on *Calliostoma variegatum* Carpenter, 1864. 9:115-116.

KEEN, A. MYRA
Siphonium, an over-used name in Mollusca. 10:125-126.

MULLINER, DAVID K.
Exploring the underwater ancient sea cliffs, an ecosystem. 8:93-94.

Photographing sea shells. 11:133-134.

MYERS, BARBARA W. & ANTHONY D'ATTILIO
Observations on *Dimya californiana* Berry, 1936 and redescription of the hinge (Bivalvia:Dimyacea). 10:119-124.

Observations on *Nipponotrophon scitulus* (Dall, 1891). 7:84-89.

POORMAN, FORREST
Reef report. [at Bahía San Carlos, Sonora, Mexico]. 2:21.

POORMAN, FORREST & LEROY POORMAN
Natica (Lunaia) lunaris Berry, 1964. 7:90

Range extension for *Trigonostoma elegantulum* Smith, 1947. 10:127.

SCHMELTZ, ROGER L.
Terebra of Midway Atoll. 5:69-70.
SHASKY, DONALD K.
Spondylus princeps in Ecuadorian antiquity. 1:9-11.

A note on *Paziella hystricina* (Dall, 1889). D'Attilio, Anthony. 8:95-96.

A supplementary note on *Favartia dorothyae* Emerson & D'Attilio, 1979. D'Attilio, Anthony. 5:67-68.

Actinotrophon actinophorus (Dall, 1889). D'Attilio, Anthony. 4:61-62.

Comments on species of *Homalocantha* (Gastropoda: Muricidae). D'Attilio, Anthony & Hans Bertsch. 2:14-20.
Deception in shell appearance. D'Attilio, Anthony. 11:129-132.

Editor's note [a collation for Keen(1971)]. 4:63

Exploring the underwater ancient sea cliffs, an ecosystem. Mulliner, David K. 8:93-94.

Minute shells *Amphissa undata* (Carpenter, 1864). Hertz, Jules. 5:66.

Minute shells *Daphnella clathrata* Gabb, 1865. Hertz, Jules. 8:97-100.

Minute shells *Homalopoma grippii* (Dall, 1911). Hertz, Jules. 1:2-5.

Modiolus capax (Conrad, 1837). Hertz, Jules. 11:135.

Muricopsis jaliscoensis Radwin & D'Attilio, 1970 at Panama. D'Attilio, Anthony. 6:78-79.
Nassarius insculptus (Carpenter, 1864). Hertz, Jules. 4:58-60.

Natica (Lunaia) lunaris Berry, 1964. Poorman, Forrest & Leroy Poorman. 7:90.

Notes on *Calliostoma variegatum* Carpenter, 1864. Hertz, Jules. 9:115-116.

Observations on *Dimya californiana* Berry, 1936 and redescription of the hinge (Bivalvia: Dimyacea). Myers, Barbara W. & Anthony D'Attilio. 10:119-124.
Observations on *Nipponotrophon scitulus* (Dall, 1891). Myers, Barbara W. & Anthony D'Attilio. 7:84-89.
Photographing sea shells. Mulliner, David K. 11:133-134.

Preliminary analysis of the geographic and bathymetric distribution of Hawaiian chromodorids (Gastropoda: Opisthobranchia). Bertsch, Hans & Scott Johnson. 6:73-77.
Range extension for *Trigonostoma elegantulum* Smith, 1947. Poorman, Forrest & Leroy Poorman. 10:127.
Reef report. [at Bahía San Carlos, Sonora, Mexico]. Poorman, Forrest. 2:21.

Seastar predation on mollusks in the San Felipe Bay area, Baja California, Mexico. Gemmell, Joyce, Carole M. Hertz & Barbara W. Myers. 2:14-20.
Siphonium, an over-used name in Mollusca. Keen, A. Myra. 10:125-126.

Spondylus princeps in Ecuadorian antiquity. Shasky, Donald K. 1:9-11.

Terebra of Midway Atoll. Schmeltz, Roger L. 5:69-70.

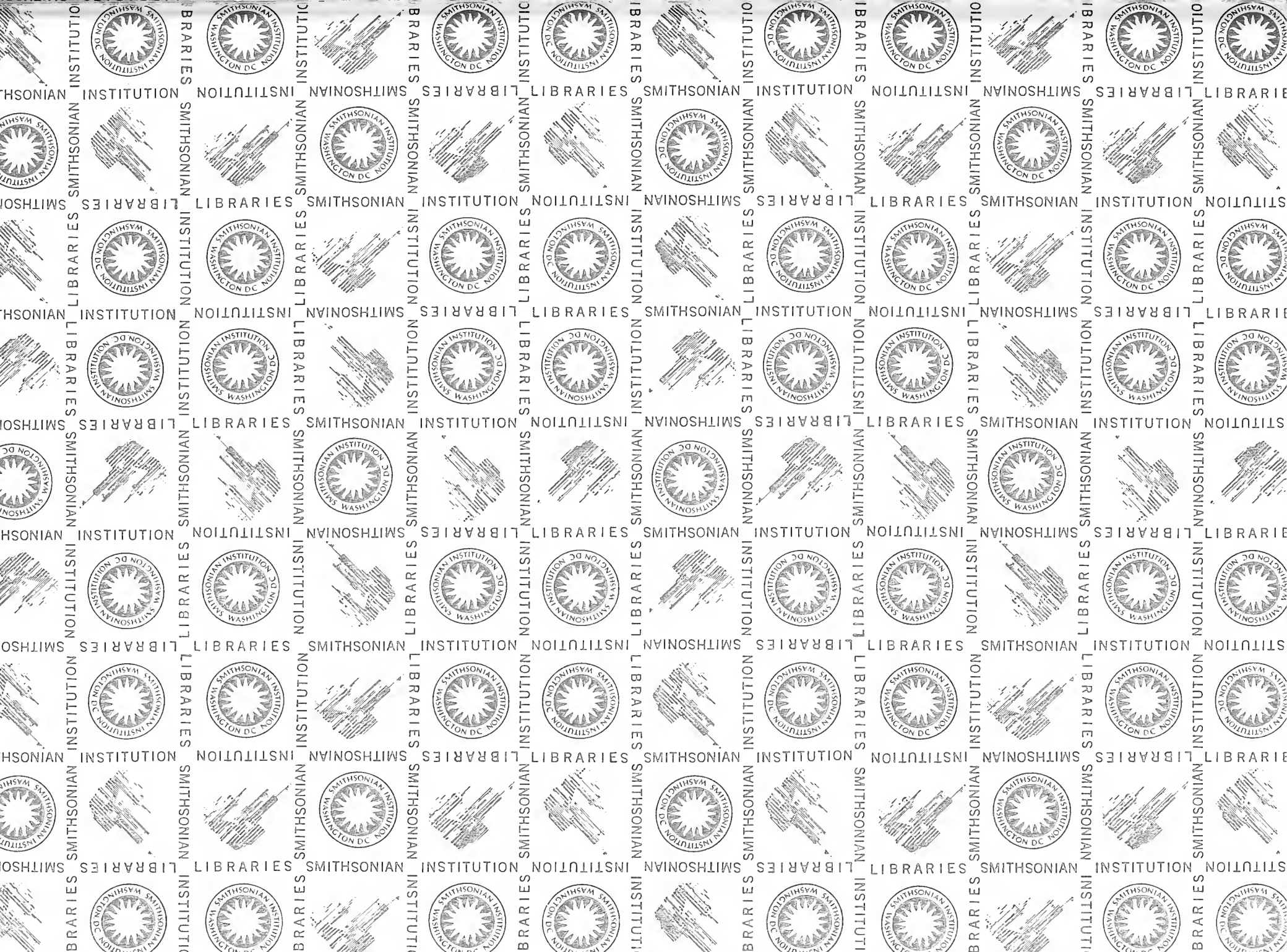
Trophon painei (Dall, 1903): an anomalous *Murex* (Gastropoda, Muricidae, Trophoninae). D'Attilio, Anthony. 1:6-9.

SAN DIEGO SHELL CLUB
% C. HERTZ
3883 MT. BLACKBURN AVE.
SAN DIEGO, CA. 92111

SAN DIEGO
PM
NOV 14

THIRD CLASS MAIL
RETURN POSTAGE GUARANTEED

Smithsonian Institution
Library-Acquisitions
Acct #9910520601
Washington D. C. 20560


SMITHSONIAN INSTITUTION LIBRARIES